WEST BENGAL STATE COUNCIL OF TECHNICAL & VOCATIONAL EDUCATION AND SKILL DEVELOPMENT

(A Statutory Body under West Bengal Act XXVI of 2013)
(Technical Education Division)
Karigari Bhavan, 4th Floor, Plot No. B/7, Action Area-III, Newtown, Rajarhat, Kolkata–700 160

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WBSCTVESD Curriculum for Diploma Courses in Printing Technology, Photography , Multimedia Technology and Architecture(1st Semester)2020

Printing Technology - Semester I

Sl No.	Category of courses	Course Title	L	T	P	Contact Hours	Credit	Marks
1	Basic Science	Mathematics-I	2	1	0	3	3	100
2	Basic Science	Applied Physics-I	2	1	0	3	3	100
3	Basic Science	Applied Chemistry	2	1	0	3	3	100
4	Humanities & Social Science	Communication Skills in English	2	0	0	2	2	100
5	Engg. Science	Engineering Graphics	0	0	3	3	1.5	100
6	Engg. Science	Printing Engineering Workshop Practice	0	0	3	3	1.5	100
7	Basic Science	Applied Physics-I Lab	0	0	2	2	1	100
8	Basic Science	Applied Chemistry Lab	0	0	2	2	1	100
9	Humanities & Social Science	Sports and Yoga	0	0	2	2	1	100
10	Humanities & Social Science	Communication Skills in English Lab	0	0	2	2	1	100
	Total Credits and Marks						18	1000

Printing Technology - Semester II

Sl No.	Category of courses	Course Title	L	T	P	Contact Hours	Credit	Marks
1	Basic Science	Mathematics II	3	1	0	4	4	100
2	Basic Science	Applied Physics II	2	1	0	3	3	100
3	Engg. Science	Introduction to IT Systems	2	0	0	2	2	100
4	Engg. Science	Basic Engineering for Printing	2	1	0	3	3	100
5	Engg. Science	Material Science for Printing	2	1	0	3	3	100
6	Basic Science	Applied Physics II Lab	0	0	2	2	1	100
7	Engg. Science	Introduction to IT Systems Lab	0	0	4	4	2	100
8	Engg. Science	Basic Engineering for Printing Lab	0	0	2	2	1	100
9	Engg. Science	Material Science for Printing Lab	0	0	2	2	1	100
10	Audit	Environmental Science	2	0	0	2	0	100
	Total Credits and Marks						20	1000

Syllabus for Engineering Mathematics-I

Course Title:	Engineering Mathematics-I
Course Code:	BS101/M-I
Number of Credits :	3(L: 2+1: T) P: 0
Pre Requisites :	1) Basic Formulae of Algebra, Trigonometry should be known 2) Preliminary knowledge of the vector
Total Contact Hours :	45 hrs.

Aim: Engineering Mathematics is the backbone of engineering students. The curriculum of mathematics has undergone changes from time to time in accordance with the need of engineering branches. The revised syllabus has been designed keeping in view the emerging needs of all categories of students. Great emphasis has been laid on the application of various contents like algebra, complex numbers, vectors, trigonometry and derivative. This course will develop analytical abilities to make exact calculations and provide a continuing educational base for the students.

Course Objectives: After the completion of the course the students will be able to

➢ apply the basic concepts of logarithm, complex number, quadratic equation and binomial theorem for solving the engineering and practical problems.

➢ find the solutions of vector oriented problems like work done, moment etc by applying vector algebra.

➢ simplify trigonometric expressions and solve trigonometric equations which will be useful in solving the scientific problems.

➢ analyze limit, continuity, derivatives of different functions and physical interpretation of derivatives which will be applicable in real situation.

Course Content

Unit-1

Algebra

1.1 Logarithm: 3 Hours

1.1.1 Definition of natural and common logarithm.

1.1.2 General Properties of logarithm and simple problems

1.2 Complex Numbers: **5 Hours**

1.2.1 Definition of Complex numbers, Real and Imaginary parts of a complex number, Equality of two complex numbers, Conjugate of a complex number

1.2.2 Modulus and Argument of a complex number and simple problems

1.2.3 Polar and Cartesian forms of a complex number and their relation.

1.2.4 Algebraic operations (Addition, Subtraction, multiplication, Division) of complex numbers

1.2.5 De Moivre's Theorem (without proof) and simple problems.

1.2.6 Cube roots of unity and their properties with problems.

1.3 Quadratic Equations: **4 Hours**

1.3.1 Definition of Quadratic Equations.

1.3.2 Finding the roots of a quadratic equation, conjugate roots& simple problems

1.3.3 Nature of the roots using discriminant & problems

1.3.4 Relation between roots and co-efficients & problems

1.3.5 Formation of quadratic equations if roots are given.

1.4 Binomial Theorem: **4 Hours**

1.4.1 Definition of factorial of a number, permutation(n_{P_r})& combination (n_{C_r}) with formula only

1.4.2 Binomial Theorem (without proof) for any index, simple problems on positive index only

1.4.3 General Term and Middle Term and problems

1.4.4 Expansion of$(1 + x)^{-1}, (1 - x)^{-1}, where\ |x| < 1$, exponential & logarithmic series only (no problem)

Unit-2

Vector Algebra **7 Hours**

2.1 Definition of vector and types of vectors

2.2 Concept of a position vector and Ratio formula& simple problems

2.3 Rectangular resolution of a vector

2.4 Equality, addition, subtraction of vectors and multiplication of a vector by a scalar

2.5 Scalar (dot) and Vector (cross) product of two vectors with properties & simple problems

2.6 Application of dot product -- work done by a force, projection of a vector upon another

2.7 Application of cross product -- finding area of a triangle and parallelogram, moment of a force

Unit-3

Trigonometry   **10 Hours**

3.1 Concept of trigonometrical angles, measurement of angles in degree, radian and grade & their relation only.

3.2 Trigonometrical ratios of angles, associated angles, Trigonometric ratios of some standard angles, problems

3.3 Compound angles formula (without proof), multiple, sub-multiple angles & simple problems

3.4 Solutions of Trigonometrical Equations, simple problems (angle lies between 0 and 2π)

3.5 Inverse Circular Function & simple problems

3.6 Properties of triangle, basic formulae only

Unit-4

Function, Limit & Continuity, Derivative

4.1 **Function**   **2 Hours**

4.1.1 Definition of variables & constants

4.1.2 Definition of function with examples, domain and range of a function

4.1.3 Types of functions (even-odd, increasing-decreasing, inverse, periodic) with simple examples

4.1.4 Graph of trigonometric functions, sin x, cos x, tan x only

4.2 **Limit & Continuity**   **2 Hours**

4.2.1 Definition of limit (with left hand limit & right hand limit), Fundamental Theorem on limit (only statement), standard limits and simple problems

4.2.2 Continuity of functions, elementary test for continuity of functions (finite limit)

4.3 **Derivative**   **8 Hours**

4.3.1 Definition of derivatives

4.3.2 Derivatives of standard functions

4.3.3 Rules of differentiation of sum, difference, product and quotient of functions.

4.3.4 Derivatives of composite functions (Chain Rule)

4.3.5 Derivatives of inverse circular functions, implicit functions and logarithmic differentiation

4.3.6 Derivative of parametric functions, derivative of a function with respect to another function

4.3.7 Second order derivatives with simple problems

4.3.8 Application of derivatives –Physical & Geometrical interpretation of derivative, checking increasing-decreasing functions, finding velocity & acceleration, Maxima-Minima of function of single variable with simple problems.

Examination Scheme:

A. Semester Examination pattern of 60 marks:

1. Objective questions- 20 marks (1 mark each question), (At least 5 question from each **group**)
2. Subjective questions- 40 marks (at least 2 questions of 10 marks from each **group**)

- **Group- A** contains <u>Unit-1 & Unit-2</u> (At least 40 marks); **Group-B** contains <u>Unit-3</u> (At least 20 marks); **Group-C** contains <u>Unit-4</u>(At least 20 marks)

N.B.- Student will answer objective type questions of 20 marks and for subjective question of 40 marks, taking at least one question from each **group** of the above three **groups**.

B. For the internal Assessment 40 marks:

1. Class Test Examination/Internal Examination; 20 marks; choose best two out of three Class Test Examinations/ Internal Examinations
2. Class Attendance; 10 marks
3. Viva/ Quiz/Presentation/Assignment/Project/Report etc.; 10 marks

Text Books & Reference -

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics, Konch & Dey, Bhagabati Publication
3. Engineering Mathematics, Babu Ram, Pearson
4. Trigonometry, S.L.Loney, S.Chand & Co.
5. Higher Algebra, H. S. Hall & Knight, Book Palace, New Delhi
6. Advanced Engineering Mathematics, E. Kreyszig, Wiley
7. Engineering Mathematics, A. Sarkar, Naba Publication
8. Diploma Engineering Mathematics, B. K. Paul, U.N.Dhar & Sons
9. Analytic Geometry Two & Three Dimensional and **Vector Analysis**, R. M. Khan, New Central Book Agency
10. Higher Algebra: Classical, S.K. Mapa, Sarat Book House
11. Introduction to Real Analysis, S.K. Mapa, Sarat Book House
12. Engineering Mathematics, Reena Garg, Khanna Publishing House, New Delhi
13. Calculus and Analytic Geometry, G. B. Thomas, R. L. Finney, Addison Wesley
14. Engineering Mathematics, V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Vikas Publishing House.
15. Advanced Engineering Mathematics, Reena Garg & Chandrika Prasad, Khanna Publishing House, New Delhi
16. Web portal: https://www.ndl.gov.in/homestudy/science
    https://ncertbooks.ncert.gov.in/login
    https://epathshala.nic.in//
    https://webscte.co.in/
    https://en.wikipedia.org/wiki/
    https://openlibrary.org/
    https://www.youtube.com/
    http://content.inflibnet.ac.in/
    https://doabooks.org/
    https://www.oapen.org/home
    http://www.gutenberg.org/
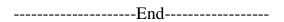17. Apps in Google Play Store: National Digital Library
                                   e-Granthalaya
                                    NSDC eBook Reader: Kaushal ePustakalaya
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Applied Physics for Sem-I (Theory)

Reviewed and prepared by Syllabus-Sub-committee, on the basis of recommendation of AICTE

Sem –I (Theory)

Course Code	:	BS103
Course Title	:	Applied Physics-I
Number of credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Physics
Course Category	:	BS

Course Content:

Unit 1: Physical world, Units and Measurements

Physical quantities; fundamental and derived, Units and systems of units (CGS and SI units),

Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis.

Measurements: Need, measuring instruments, least count, types of Measurement (direct, indirect), Errors in Measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.

Unit 2: Force and Motion

Force, Momentum, Conservation of linear momentum, its applications such as recoil of gun, numerical problems rockets (concept only), Impulse and impulsive force.

Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period, relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical), concept of Centripetal and centrifugal forces with examples (No derivation, only formula) banking of roads and bending of cyclist,concept and formula and numerical problems.

Unit 3: Work, Power and Energy

Work: Concept and units, examples of zero work, positive and negative work

Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications, Work done in moving an object on rough inclined plane.

Energy and its units, kinetic energy and potential energy, Conservation of mechanical energy for freely falling bodies(simple numerical problems), transformation of energy (examples only).

Power and its units, power and work relationship, calculation of power (numerical problems).

Unit 4: Rotational Motion

Translational and rotational motion with examples, Definition of torque and angular momentum and their relation, Conservation of angular momentum (quantitative) and its applications.

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, ring and sphere (hollow and solid); (Formulae only). Simple numerical problems.

Unit 5: properties of Matter

Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve.

Surface tension: Concept, units, cohesive **and adhesive forces**, angle of contact, Capillary rise (formula only), applications of surface tension, effect of temperature and impurity on surface tension.

Viscosity and coefficient of viscosity: terminal velocity, Stoke's law and effect of temperature on viscosity.

Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynol**d**'s number Equation of continuity, Bernoulli's Theorem (only formula and numericals) and its applications (mention name only).

Unit 6: Heat and Thermometry

Concept of heat and temperature, basic concepts of measurements of heat and temperature, modes of heats transfer (conduction, convection and radiation with examples), Co-efficient of thermal conductivity simple numerical problems.

Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions of solids and relation amongst them, specific heats Cp & Cv of a gas and their relationship (Mention only).

References:

1. Text Book of Physics for Class XI& XII (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. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
5. Engineering Physics by DK Bhattacharya & Poonam Tandan; Oxford University Press, New Delhi
6. Comprehensive Practical Physics, Vol,I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
7. Practical Physics by C.L. Arora, S. Chand Publication.
8. Comprehensive Physics Vol,I & II.

Applied Physics for Sem-I (Lab)

Course Code	:	BS107
Course Tittle	:	Applied Physics-I Labs
Numbers of Credits	:	1 (L:0, T:0, P:2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

List of Practical's/Activities(To perform minimum 8 practical's).

1. To measure the volume of the material of a given hollow cylinder, using a Vernier calipers.
2. To determine the area of cross section of a thin wire using a screw gauge.
3. To determine radius of curvature of a convex and a concave mirror/ surface using a spherometer.
4. To find the co-efficient of friction between wood and glass using a horizontal board.
5. To determine force constant of a spring using Hook's law.
6. To find the moment of inertia of a flywheel.
7. To find the viscosity of a given liquid (Glycerin) by Stoke's law
8. To find the co-efficient of linear expansion of the material of a rod.
9. To **verify** Boyle's law.
10. To determine the relative density of sand by using a sp. gr. Bottle.

Reference books:

1. Text books of Physics for Class-XI & XII (Part-I & II); N.C.E.R.T., Delhi.
2. Comprehensive Practical Physics, Vol-I & II, JN Laxmi Publications (P) Ltd.,
3. Practical Physics by C.L. Arora, S. Chand Publication.

Applied Chemistry

Course Code	:	BS105
Course Title	:	Applied Chemistry
Number of Credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Chemistry
Course Category	:	BS

Course Objectives:

There are numerous number materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. On successful completion of this course content will enable technicians to understand, ascertain and analyse and properties of natural raw materials require for producing economical and eco-friendly finished products.

- Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications
- Solve the engineering problems using concept of Electrochemistry and corrosion.

Instruction on question setting:

- Question paper contains three groups A, B and C. Unit 1 and unit 2 are included in group A, unit 3 and unit 4 in group B, unit 5 in group C.
- 20 (twenty) number of questions are of objective types consisting of all groups, each carrying 1 (one) mark.
- 5 (five) questions are to be answered taking at least one from each group (each question carries 8 marks).

Course Content:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

  Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers - orbital concept. Shapes of s, p and d orbitals Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.

  Type of chemical bonding: ionic, covalent, metallic and hydrogen bonds. Example of each type. Hybridization, sp^3, sp^2, sp, example: $BeCl_2$, BF_3, CH_4, NH_3, H_2O; structure of diamond, graphite.

  Solution - idea of solute, solvent and solution, methods to express the concentration of solution-molarity (M = mole per liter), ppm, mass percentage, volume percentage and mole fraction.

- **Unit 2: Water**

  Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness.

  Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

  1) Water softening techniques - soda lime process, zeolite process and ion exchange process.
  2) Municipal water treatment (in brief only) - sedimentation, coagulation, filtration, sterilization.

  Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).

- **Unit 3: Engineering Materials**

Natural occurrence of metals - minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag, metallurgy - brief account of general principles of metallurgy. Extraction of iron from haematite ore using blast furnace, aluminium from bauxite along with reactions, reactions during copper extraction. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.

General chemical composition, composition based applications (elementary idea only details omitted):

Port land cement and hardening, Glasses Refractory and Composite materials.

Polymers - monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon - 6, nylon - 66, Bakelite only), rubber and vulcanization of rubber.

- **Unit 4: Chemistry of Fuels and Lubricants**

Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.

Proximate analysis and ultimate analysis of coal solid fuel

petrol and diesel - fuel rating (octane and cetane numbers),

Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

Lubrication - function and characteristic properties of good lubricant, classification with examples, lubrication mechanism - hydrodynamic and boundary lubrication, physical properties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.

- **Unit 5: Electro Chemistry**

Electronic concept of oxidation, reduction and redox reactions.

Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.

Elementary concept of pH and buffer.

Industrial Application of Electrolysis –
  - Electrometallurgy
  - Electroplating
  - Electrolytic refining.

Application of redox reactions in electrochemical cells –
  - Primary cells - dry cell,
  - Secondary cell - commercially used lead storage battery, fuel and Solar cells.

Introduction to Corrosion of metals –
  - definition, types of corrosion (chemical and electrochemical), H_2 liberation and O_2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.

Internal corrosion preventive measures –
  - Purification, alloying and heat treatment and

External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.

Applied Chemistry

Suggested Sessional work:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

    Assignments: Writing electronic configuration of elements up to atomic number 30 (Z= 30). Numerical on molarity, ppm, mass percentage, volume percentage and mole fraction of given solution.

    Seminar: 1. Quantum numbers,
    2. Discuss the metallic properties such as malleability, ductility, hardness, high melting point, conductance of heat and electricity, magnetic properties of metals.

    Projects: Model of molecules $BeCl_2$, BF_3, CH_4, NH_3, H_2O

- **Unit 2: Water**

    Assignments: Simple problems on hardness calculation.

    Seminar: 1. Quality and quantity requirement of water in house and industry.
    2. Quality of control measures of effluents (BOD & COD).

    Projects: Collect water samples from different water sources and measure of hardness of water.

- **Unit 3: Engineering Materials**

    Assignments: Preparation of table showing different ores of iron, copper and aluminium metals along with their chemical compositions and classify in to oxide sulphide halide ores.

    Seminar: Discuss the chemical reactions taking place in Blast Furnace in extraction of iron; Reactions occurring during extraction of copper and aluminium metals.

    Projects: Make table showing place of availability of different ores in India and show places on India map.

- **Unit 4: Chemistry of Fuels and Lubricants**

    Assignments: Calculation of HCV and LCV of fuel using fuel composition in Dulong's formula.

    Seminar: Chemical structure of fuel components influence on fuel rating.

    Projects: Mapping of energy recourses in India. Collection of data of various lubricants available in the market.

- **Unit 5: Electro Chemistry**

    Assignments: Simple problems on Faradays laws of electrolysis.

    Seminar: 1. Corrosion rate and units.
    2. Corrosion preventions.

    Projects: Mapping of area in India prone to corrosion. Collection of data of various electrochemical cells batteries used in equipment and devices and available in market. Visit to sites such as Railway station to watch corrosion area in railways and research establishment in and around the institution.

References/Suggested Learning Resources:
(a) Books:
1) Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2) Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
3) C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
4) S. S. Dara & S.S.Umare, Engineering Chemistry, S. Chand. Publication, New Delhi, New Delhi, 2015.
5) Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
6) S. Vairam, Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
7) G. H. Hugar & A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. l and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
8) Rajesh Agnihotri, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

(b) Open source software and website address:
1) www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
2) www.visionlearning.com (Atomic structure and chemical bonding)
3) wwwcheml.com (Atomic structure and chemical bonding)
4) https://www.wastewaterelearning.com/elearning/ (Water Treatment)
5) www.capital-refractories.com (Metals, Alloys, Cement, and Refractory Materials)
6) www.em-ea.org/guide%20books/book-2/2.1%20fuels%20and%20combustion.pdf (Fuel and Combustion)
7) www.chemcollective.org (Metals, Alloys)
8) www.wqa.org(Water Treatment)

Applied Chemistry Lab

Course Code	:	BS109
Course Title	:	Applied Chemistry Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:
There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

LIST OF PRACTICALS:

Perform any 12 (twelve) Laboratory Practicals:
Volumetric and Gravimetric analysis.

1. Preparation of standard oxalic acid and standard potassium dichromate solution.
2. To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution and phenolphthalein as indicator.
3. Standardization of potassium permanganate solution using standard oxalic acid and determination of percentage of iron present in given Hematite ore by $KMnO_4$ solution
4. a) Standardization of sodium thiosulphate using standard potassium dichromate solution by IODOMETRY.

    b) Iodometric estimation of copper in copper pyrite ore.
5. Volumetric estimation of total acid number (TAN) of given oil.
6. Volumetric estimation of
    a. Total hardness of given water sample using standard EDTA solution.
    b. Alkalinity of given water sample using 0.01N sulphuric acid.
7. Proximate analysis of coal
    a. Gravimetric estimation moisture in given coal sample.
    b. Gravimetric estimation ash in given coal sample

Instrumental analysis

8. Determine the conductivity of given water sample.
9. Determination of the Iron content in given cement sample using colorimeter.
10. Determination of viscosity of lubricating oil using Redwood viscometer.
11. Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
12. To verify the first law of electrolysis of copper sulfate using copper electrode.
13. Construction and measurement of emf of electrochemical cell (Daniel cell).
14. To study the effect of dissimilar metal combination on cell emf.
15. To apply thin layer chromatography for separation of mixture of inorganic/organic compounds.
16. Qualitative detection of ARSENIC in a given sample of water (~5 ppm solution of sodium arsenite)
17. Determination of dissolved oxygen in a sample of water.
18. Determination of pH value of unknown solution.

Reference book
    VOGELS INORGANIC QUANTITATIVE ANALYSIS.

Members present in Syllabus Committee:
1. **Dr. Ujjval Kumar Bhattacharyya** (convener, lecturer, North Calcutta Polytechnic).
2. **Dr. Gandhi Kumar Kar** (Professor and head of the Dept. of Chemistry, Presidency University, Kolkata)
3. **Dr. Shyamal Kumar Chattopadhyay** (Professor IIEST, Shibpur).
4. **Dr. Mrinal Kanti Bain**, lecturer, Calcutta Technical School.
5. **Dr. Dipankar Maity**, lecturer, Birla Institute of Technology.
6. **Dr. Ranjal Paul**, Sr. Manager, Sun Pharmaceuticals Baroda.
7. **Prolay Roy,** lecturer, Memari Government Polytechnic.

Syllabus of Communication Skills in English

{The syllabus for the subject has been prepared by the Syllabus Sub-committee for the subject "Communication Skills in English" in accordance with the following instructions / directions received from Mr. B. Samanta (WBSCTVESD) vide his mail dated Dec. 6, 2019 at 12.04 PM}:-

"A meeting was held on 31.10.2019 at the Council. In the meeting following decisions were taken by the Council
1.   It was decided unanimously to adopt the curriculum structure of the AICTE model syllabus 2019(attached) for all diploma courses of WBSCTVESD.
2.   New curriculum structure and syllabus of diploma courses shall be prepared as per AICTE model Syllabus 2019 and implemented from the next academic session i.e. 2020-21 in phase manner.
3.   Content of the syllabus of diploma courses shall be customized as per the requirement and as per the advice of the syllabus sub- committee."

Sl. No.	Code No.	Course Title	Hours per week (Total-4)			Semester	Credits
			Lecture	Tutorial	Practical		
1	HS 101	Communication Skills in English	2	0	0	1	2
2	HS105	Communication Skills in English - Lab	0	0	2	1	1
Total number of weeks – 17 (seventeen)							

Preamble:

Engineering is a service, and therefore it exists to meet human needs. Needs are communicated through language. No engineer, no matter how brilliant, can do a good job if she or he does not know what the job is for, who they are serving, for what purpose, and what needs to be done to render this service. Feedback also has to be communicated in language: figures are not enough without explanation. Communication, spoken or written, is thus essential for any service provider to do their job.

However, in most cases the courses and syllabi offered to STEM undergraduates do not adequately address the need to make them good communicators. It is often assumed that this question has been addressed by schooling, or they attempt to adapt liberal arts courses to the needs of STEM workers, thereby failing to address those needs. In a country such as India where language learning in general and English learning in particular tend to be neglected or mis-taught, this problem is compounded. To be successful, communicative language learning has to be a two way process, with communication between the teacher and student, and between students. However, the culture of student passivity in the classroom which prevails in India is poor soil for these skills to take root.

We have therefore attempted in this course to produce a system that allows, (within the known constraints) even in a limited form, for project work and conversations, collaboration and role-play, to mitigate the 'keep quiet' culture of the Indian classroom and to encourage young people to find their voices. Polytechnic, College and university students are just one small step away from becoming young professionals, and once they take that step their livelihoods (and also the safety and happiness of their clients) will depend upon how well they can ask and answer questions in the real world.

Without adequate practice, confidence-building and positive reinforcement, the practice of teaching them the pedantic small points of the rules of English grammar, or obsessing over their pronunciation, only serves to silence them further. What they need is an environment where they can communicate with each other and then troubleshoot the results, go over bad communication and make it better, identify their mistakes and correct them without being terrorised by cultural stereotypes. Graduate education should be a safe space for them to do this before work in the real world attaches real penalties to the results of bad communication. With this syllabus and attached guidelines, we have tried to take a small step in the right direction.

Course Title: **Communication Skills in English**

Course Code No.: **HS101**

Hours per week: **02 (Lecture), Total contact hours / week: 02**

Credits: **02**

Course Objectives (AICTE): Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus the main objectives of this course are:

- To develop confidence in speaking English with correct pronunciation
- To develop communication skills of the students i.e. listening, speaking, reading and writing skills
- To introduce the need for personality development – Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc.

Course Content (Theory)
Unit – 1 Communiucation: Theory and Practice

- Basics of communication: Introduction, meaning and definition, process of communication etc.
- Types of communication: formal and informal, verbal, non-verbal and written. Barriers to effective communication
- 7 Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).
- Art of Effective communication,

- o Choosing words
- o Voice
- o Modulation
- o Clarity
- o Time
- o Simplification of words

- Technical Communication

Unit – 2 Soft Skills for Professional Excellence

- Introduction: Soft Skills and Hard Skills.
- Importance of Soft Skills.
- Life skills: Self-awareness and Self-analysis, adaptability, social skills, emotional intelligence, Interpersonal relationship and empathy etc.
- Applying soft skills across cultures – Corporate work culture, Work persona, Professionalism, Time Management
- Case Studies

Unit – 3: Reading Comprehension

Note Taking, Comprehension, vocabulary enhancement and grammar exercises based on reading of texts.

Unit – 4: Professional Writing

The art of writing Report and Memo
CVs
Letters: Job Application and Business
Drafting e-mail, minutes of a meeting, etc

Unit – 5: Vocabulary and Grammar

Remedial Grammar and Exercises
Professional Workplace Communication
Parts of speech, active and passive voice, tenses etc.

Course outcomes (AICTE):
At the end of this course, the participants will:

- Develop basic speaking and writing skills including proper usage of language and vocabulary so that they can become highly confident and skilled speakers and writers.
- Be informed of the latest trends in basic verbal activities such as presentations, facing interviews and other forms of oral communication.
- Also develop skills of group presentation and communication in team.
- Develop non-verbal communication such as proper use of body language and gestures

Course Title: **Communication Skills in English - Lab**

Course Code No.:   **HS105**

Hours per week: **02 (Practical), Total contact hours / week: 02**

Credits: **01**

Course Objectives (AICTE):

Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus the main objectives of this course are:

1. To develop listening skills for enhancing communication.
2. To develop speaking skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality development – Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills, etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content:

Unit – 1:
Basic Common Communication Problems and their Solutions

Unit – 2:
Introduction to Phonetics
Sounds: consonant, vowel. Transcription of words (IPA), weak forms etc.

Unit – 3:
Speaking and Listening Skills
Standard and Formal Speech: Oral presentations, Group Discussions, Public Speaking, Business presentations etc. Conversation practice and role playing, Job interviews, Note taking etc.

Unit – 4:
Non-verbal Communication
Proxemics, Haptics and Kinesics

Members of the Syllabus Sub-committee for *Communication Skills in English:-*

1. Prof. Rimi B. Chatterjee (Expert),
   Professor, Department of English, Jadavpur University and former Professor of English at IIT, Kharagpur, West Bengal.
   (Prof. Chatterjee, the subject expert, has wide ranging experience in teaching Communication Skills in English to Engineering students, both in IIT, Kanpur and Jadavpur University).
2. Ms. Purna Biswas (Member), Lecturer in Humanities, EIJE, Dalalpukur, Howrah
3. Mr. Santanu Mitra (Member), Lecturer in Humanities, Women's Polytechnic, Kolkata
4. Mr. Hemadri Chatterjee (Convener), Lecturer in Humanities, Ramakrishna Mission Shilpapitha, Belgharia, Kolkata

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Proposed Syllabus for Engineering Graphics

Name of the Course :	Engineering Graphics	
Course Code :	Semester : First	
Duration : 17 Weeks	Maximum Marks :	: 100
Lecture : Nil	Assignment	: 20
	Class Performance	: 20
Tutorial : Nil	Viva Voce	: 10
	Attendance	: 10
Practical : 3 hrs./week	External (Viva, Sketch Book & Drawing Sheet)	: 40
Credit : 1.5		

Aim :
1. The Course is aimed to develop the basic graphic skills so that the students can prepare Engineering Drawing in their practical field.
2. Understand the fundamentals of Engineering Graphics.
3. Read and interpret object drawing.
4. To develop the skills of Computer Aided Drafting and can easily cope up the skill of drafting for modern drawing offices/industries.

Objectives :
1. To develop sense of Scale and drawing technique of different curves and their application.
2. To develop drafting and sketching skills, to know the applications of drawing equipment and get familiarize with Indian Standards related to engineering drawing.
3. To develop concept of Orthographic Projection and to draw Orthographic Views for different objects.
4. To visualize three dimensional objects from Orthographic Views and to draw isometric views/projections.
5. To be familiar with AutoCAD and to develop the skill of drafting in AutoCAD by using different commands.

Pre-requisites :
1. Unambiguous and clear visualization.
2. Sound Pictorial Intelligence.

Unit No.	Contents	
Unit 1	1.1 Letters and numerals (Single Stroke Vertical) 1.2 Conventions of lines and their applications 1.3 Concept of Representative Fraction (R.F), Reduced scale, Enlarged scale & Full Scale, Engineering Scale such as Plain Scale & Diagonal Scale. 1.4 Dimensional Techniques - Unidirectional System and Aligned System.	

Unit 2	2.1 Geometrical Construction :
	  a)Draw Regular Polygons, Ellipse, Parabola, hyperbola
	  b) Draw Curve passing through given no. of points, cycloid, involute of a circle and polygon	

Unit 3	3.1 Introduction to Orthographic Projection : Concept of First Angle & Third Angle of projection. Projections of lines(limited to both ends in 1st quadrant) : parallel to the reference planes, inclined to the reference planes (1st Angle Method) 3.2 Projections of solid body: Regular Polygonal Pyramid, Cylinder, Cone - inclined to only one reference plane (1st Angle Method)	

Unit 4	4.1 Conversion of Pictorial Views into orthographic views (Simple Objects &First Angle Projection Method Only)
Unit 5	5.1 Introduction to Isometric Projections, Concept of Isometric Scale and Isometric Views 5.2 Conversion of Orthographic views into Isometric Views/Projections : Simple Objects e.g. regular prism, pyramid, cone, cylinder.
Unit 6	6.1 Free hand sketches of engineering elements such as thread profile, nuts, bolts, studs, set screws, washers, locking arrangements etc. and their conventional representation (For branches other than Mechanical Engineering, the teachers should select branch specific elements for free hand sketching)

Unit 7	7.1 Introduction to different commands and toolbars of AutoCAD
	    a) Draw command : Lines, Circle, Polygon, Arc, Ellipse, Polyline, Fillet, Chamfer, Hatch, Array (Rectangular & Polar) etc.
	    b) Modify Command : Offset, Trim, Extend, Erase, Fillet, Chamfer, Break, Lengthen, Copy, Move, Mirror, Stretch, Match Properties, Pedit etc.
	    c) View : Zoom All, Zoom Window, Zoom Extent etc.
	    d) Dimensioning : Dimension Setting, Linear, Aligned, Radial, Diameter, Leader, Angular etc.
	    c) Text : Text Style, Dtext, Mtext, DDedit etc.
	    d) Format : Limits, Layers, Pan etc.
	7.2 Making a few simple 2D drawings in AutoCAD.

Sl. No.	Practical Exercise	Unit No.	Hrs.
1	Draw horizontal, vertical, 30˚, 45˚, 60˚, 75˚, different types of lines, dimensioning styles using Tee and Set Squares / Drafters. (Do this exercise in Sketch Book)	1	02
2	Write single stroke vertical alphabets and numerical (7:4 ratio) (Do this exercise in Sketch Book)	1	02
3	Draw regular geometric constructions and redraw/copy the given figure (Do this exercise in Sketch Book)	1	02
4	Draw at least two problems on plain scale and two problems on diagonal scales (Do this exercise in Sketch Book)	1	03
5	Draw problems on ellipse, parabola, involute and cycloid (Do this exercise in Sketch Book)	2	06
6	Draw at least two problems on lines and two problems on solid (First Angle Projection method) (Do this exercise in A2 size drawing sheet)	3	09
7	Plan, Elevation and Side View of at least two pictorial views to be drawn on one A2 size Drawing Sheet along with dimensions	4	06
8	At least Two Isometric Views and two Isometric Projections to be drawn on one A2 size Drawing Sheet	5	06

9	Draw free hand sketches / conventional representation of machine elements such as thread profile, nuts, bolts, studs, set screws, washers, locking arrangements etc.	6	03
10	Simple geometrical figures such as triangle, rectangle, polygon, circle, ellipse, and simple orthographic views of brackets, gaskets etc. to be drawn in AutoCAD and Printout to be taken on A4 size Sheet. At least two sheets to be prepared.	7	12
	Total Period		51

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
N.D.Bhatt	Engineering Drawing	53rd Edition	Charotkar Publishing House
R.K.Dhawan	Engineering Drawing	Revised Edition 2015	S.Chand & Co.
K. Venugopal & V. Prabhuraja Raja	Engineering Drawing and Graphics + AutoCAD		New Age Publication

Reference Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
S.N. Lal	Engineering Drawing		CENGAGE
Basant Agrawal & C M Agrwal	Engineering Drawing		Tata McGrew Hill
Dhananjay A Jolhe	Engineering Drawing with an Introduction to AutoCAD		Tata McGrew Hill
S.P.Dey	AutoCAD 2014		Vikas Publisher
P.S. Gill	Engineering Drawing		S.K.Kataria & Sons.

References :

1.Engineering Graphics Syllabus of AICTE Model Curriculum 2019.

2. Syllabus of Technical Drawing (Old) of W.B.S.C.T.E

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to sites such as Railway station and research establishment around the institution.

Learning Outcomes:

At the end of the course student will be able to

- To express quantitative measurements accurately.
- To practice and adapt good measuring techniques.
- To use various apparatus for precise measurements.
- To understand and differentiate different methods of quantitative analysis.
- To know and understand principles of quantitative analysis using instruments.
- To construct different electrochemical cells used in developing batteries.
- To understand and appreciate methods of corrosion abetments.

Reference Books:

1. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
4. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

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Course Code	:	HS103
Course Title	:	Sports and Yoga
Number of Credits	:	1(L:0,T:0,P:2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:

- To make the students understand the importance of sound health and fitness principles as they relate to better health.
- To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
- To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
- To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Course Content:

- **Introduction to Physical Education**

  o Meaning & definition of Physical Education

  o Aims & Objectives of Physical Education

  o Changing trends in Physical Education

- **Olympic Movement**

  o Ancient & Modern Olympics (Summer & Winter)

  o Olympic Symbols, Ideals, Objectives & Values

  o Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)

- **Physical Fitness, Wellness & Lifestyle**

  o Meaning & Importance of Physical Fitness & Wellness

  o Components of Physical fitness

  o Components of Health related fitness

  o Components of wellness

  o Preventing Health Threats through Lifestyle Change

  o Concept of Positive Lifestyle

- **Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**

  o Define Anatomy, Physiology & Its Importance

  o Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)

- **Kinesiology, Biomechanics & Sports**

  o Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports

  o Newton's Law of Motion & its application in sports.

  o Friction and its effects in Sports.

- **Postures**

  o Meaning and Concept of Postures.

  o Causes of Bad Posture.

  o Advantages & disadvantages of weight training.

  o Concept & advantages of Correct Posture.

  o Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis.

  o Corrective Measures for Postural Deformities

- **Yoga**

  o Meaning & Importance of Yoga

  o Elements of Yoga

  o Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas

  o Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Sha-shankasana)

  o Relaxation Techniques for improving concentration - Yog-nidra

- **Yoga & Lifestyle**

  o Asanas as preventive measures.

  o Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana.

  o Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.

  o Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.

  o Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana.

  o Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

- **Training and Planning in Sports**

  o Meaning of Training

  o Warming up and limbering down

  o Skill, Technique & Style

  o Meaning and Objectives of Planning.

  o Tournament – Knock-Out, League/Round Robin & Combination.

- **Psychology & Sports**

  o Definition & Importance of Psychology in Physical Edu. & Sports

  o Define & Differentiate Between Growth & Development

  o Adolescent Problems & Their Management

  o Emotion: Concept, Type & Controlling of emotions

  o Meaning, Concept & Types of Aggressions in Sports.

  o Psychological benefits of exercise.

  o Anxiety & Fear and its effects on Sports Performance.

  o Motivation, its type & techniques.

  o Understanding Stress & Coping Strategies.

- **Doping**
  - o Meaning and Concept of Doping
  - o Prohibited Substances & Methods
  - o Side Effects of Prohibited Substances

- **Sports Medicine**
  - o First Aid – Definition, Aims & Objectives.
  - o Sports injuries: Classification, Causes & Prevention.
  - o Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries

- **Sports / Games**

  Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.

  - o History of the Game/Sport.
  - o Latest General Rules of the Game/Sport.
  - o Specifications of Play Fields and Related Sports Equipment.
  - o Important Tournaments and Venues.
  - o Sports Personalities.
  - o Proper Sports Gear and its Importance.

References:
1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

Course Outcomes:

On successful completion of the course the students will be able to:
(i) Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
(ii) Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
(iii) Learn breathing exercises and healthy fitness activities
(iv) Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.
(v) Perform yoga movements in various combination and forms.
(vi) Assess current personal fitness levels.
(vii) Identify opportunities for participation in yoga and sports activities.
(viii) Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
(ix) Improve personal fitness through participation in sports and yogic activities.
(x) Develop understanding of psychological problems associated with the age and lifestyle.

(xi)   Demonstrate an understanding of sound nutritional practices as related to health and physical performance.

(xii)   Assess yoga activities in terms of fitness value.

(xiii) Identify and apply injury prevention principles related to yoga and physical fitness activities.

(xiv) Understand and correctly apply biomechanical and physiological principles elated to exercise and training.

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Course Code	:	HS105
Course Title	:	Communication Skills in English - Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:
Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:

1. To develop listening skills for enhancing communication.

2. To develop speaking skills with a focus on correct pronunciation and fluency.

3. To introduce the need for Personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content:
Unit 1 Listening Skills
Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

Unit II Introduction to Phonetics
Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.

Unit III Speaking Skills
Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.

Unit IV Building vocabulary
Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to enhance self-expression and vocabulary of participants.

Recommended Readings:
1. Daniel Jones. *The Pronunciation of English.* Cambridge: Cambridge University Press, 1956.

2. James Hartman& et al. Ed. *English Pronouncing Dictionary.* Cambridge: Cambridge University

Course: Printing Engineering Workshop Practice

Course Code:	Semester: First
Duration: 15 weeks	Maximum Marks:
Teaching Scheme	Examination Scheme
Theory & Tutorial: NIL	Attendance & Teacher Assessment: 50% of Maximum marks
Pre-requisite Knowledge: NIL	End semester examination: 50% of Maximum marks
Practical: 3hrs./week	Credit: 1.5

Aim: To impart practical knowledge in basic printing engineering work shop.

Outcome:

1. **Identify, select, & use various tools & equipment and consumables present in typesetting & composition lab and reproduction photography lab.**
2. **Compose a text matter by choosing proper tools and techniques through manual process**
3. **Prepare a line negative by selecting proper tool, equipment & techniques**
4. **Demonstrate the process to care & maintain the tools & machines in the workshop**

Group A: Typesetting & Composition

1. Familiarization with various tools & equipment in the concerned section.
2. Case Layout (English); Use of tools & equipment; Use of spacing materials
3. How to compose straight matter.
4. Practice on composing stick and hand composing techniques.
5. Proving of composed matter, correction and reproving.
6. Demonstration of keyboard and casting unit of hot metal mechanical composing systems.
7. Demonstration of various cold composing systems.
8. Acquaintance with Desktop Publishing.

Group B: Reproduction Photography

1. Familiarization with various tools & equipment and furniture in the concerned section.
2. Preparation of lists / charts of various tools & equipment.
3. Acquaintance with lenses, prism & conventional glass screen for making halftone.
4. Preparation of Black & White line negatives / positives — practice on process camera: Scaling, Cropping, Illuminating.
5. Acquaintance with processing chemicals and different retouching materials.
6. Acquaintance with checking the negatives and correcting the same through etching, retouching, reducing, intensification.
7. Demonstration of various cameras, correction procedures of films.

PHOTOGRAPHY : Semester I

Sl No.	Category of Courses	Course Title	L	T	P	Contact Hours	Credit	Marks
1	Basic Science	Mathematics-I	2	1	0	3	3	100
2	Basic Science	Applied Physics-I	2	1	0	3	3	100
3	Basic Science	Applied Chemistry	2	1	0	3	3	100
4	Humanities & Social Science	Communication Skills in English	2	0	0	2	2	100
5	Engg. Science	Engineering Graphics	0	0	3	3	1.5	100
6	Engg. Science	Workshop Practice on Still Photography	0	0	3	3	1.5	100
7	Basic Science	Applied Physics-I Lab	0	0	2	2	1	100
8	Basic Science	Applied Chemistry Lab	0	0	2	2	1	100
9	Humanities & Social Science	Sports and Yoga	0	0	2	2	1	100
10	Humanities & Social Science	Communication Skills in English Lab	0	0	2	2	1	100
		Total Credits and Marks					18	1000

PHOTOGRAPHY : Semester II

Sl No.	Category of courses	Course Title	L	T	P	Contact Hours	Credit	Marks
1	Basic Science	Mathematics II	3	1	0	4	4	100
2	Basic Science	Applied Physics II	2	1	0	3	3	100
3	Engg. Science	Introduction to IT Systems	2	0	0	2	2	100
4	Engg. Science	Basic Photography I	2	1	0	3	3	100
5	Engg. Science	Basic Photography II	2	1	0	3	3	100
6	Basic Science	Applied Physics II Lab	0	0	2	2	1	100
7	Engg. Science	Introduction to IT Systems Lab	0	0	4	4	2	100
8	Engg. Science	Basic Photography I Lab	0	0	2	2	1	100
9	Engg. Science	Basic Photography II Lab	0	0	2	2	1	100
10	Audit	Environmental Science	2	0	0	2	0	100
		Total Credits and Marks					20	1000

Syllabus for Engineering Mathematics-I

Course Title:	Engineering Mathematics-I
Course Code:	BS101/M-I
Number of Credits :	3(L: 2+1: T) P: 0
Pre Requisites :	1) Basic Formulae of Algebra, Trigonometry should be known 2) Preliminary knowledge of the vector
Total Contact Hours :	45 hrs.

Aim: Engineering Mathematics is the backbone of engineering students. The curriculum of mathematics has undergone changes from time to time in accordance with the need of engineering branches. The revised syllabus has been designed keeping in view the emerging needs of all categories of students. Great emphasis has been laid on the application of various contents like algebra, complex numbers, vectors, trigonometry and derivative. This course will develop analytical abilities to make exact calculations and provide a continuing educational base for the students.

Course Objectives: After the completion of the course the students will be able to

➢ apply the basic concepts of logarithm, complex number, quadratic equation and binomial theorem for solving the engineering and practical problems.

➢ find the solutions of vector oriented problems like work done, moment etc by applying vector algebra.

➢ simplify trigonometric expressions and solve trigonometric equations which will be useful in solving the scientific problems.

➢ analyze limit, continuity, derivatives of different functions and physical interpretation of derivatives which will be applicable in real situation.

Course Content

Unit-1

Algebra

1.1 Logarithm: 3 Hours

1.1.1 Definition of natural and common logarithm.

1.1.2 General Properties of logarithm and simple problems

1.2 Complex Numbers: 5 Hours

1.2.1 Definition of Complex numbers, Real and Imaginary parts of a complex number, Equality of two complex numbers, Conjugate of a complex number

1.2.2 Modulus and Argument of a complex number and simple problems

1.2.3 Polar and Cartesian forms of a complex number and their relation.

1.2.4 Algebraic operations (Addition, Subtraction, multiplication, Division) of complex numbers

1.2.5 De Moivre's Theorem (without proof) and simple problems.

1.2.6 Cube roots of unity and their properties with problems.

1.3 Quadratic Equations: 4 Hours

1.3.1 Definition of Quadratic Equations.

1.3.2 Finding the roots of a quadratic equation, conjugate roots& simple problems

1.3.3 Nature of the roots using discriminant & problems

1.3.4 Relation between roots and co-efficients & problems

1.3.5 Formation of quadratic equations if roots are given.

1.4 Binomial Theorem: 4 Hours

1.4.1 Definition of factorial of a number, permutation(n_{P_r})& combination (n_{C_r}) with formula only

1.4.2 Binomial Theorem (without proof) for any index, simple problems on positive index only

1.4.3 General Term and Middle Term and problems

1.4.4 Expansion of$(1 + x)^{-1}, (1 - x)^{-1}, where |x| < 1$, exponential & logarithmic series only (no problem)

Unit-2

Vector Algebra 7 Hours

2.1 Definition of vector and types of vectors

2.2 Concept of a position vector and Ratio formula& simple problems

2.3 Rectangular resolution of a vector

2.4 Equality, addition, subtraction of vectors and multiplication of a vector by a scalar

2.5 Scalar (dot) and Vector (cross) product of two vectors with properties & simple problems

2.6 Application of dot product -- work done by a force, projection of a vector upon another

2.7 Application of cross product -- finding area of a triangle and parallelogram, moment of a force

Unit-3

Trigonometry   **10 Hours**

3.1 Concept of trigonometrical angles, measurement of angles in degree, radian and grade & their relation only.

3.2 Trigonometrical ratios of angles, associated angles, Trigonometric ratios of some standard angles, problems

3.3 Compound angles formula (without proof), multiple, sub-multiple angles & simple problems

3.4 Solutions of Trigonometrical Equations, simple problems (angle lies between 0 and 2π)

3.5 Inverse Circular Function & simple problems

3.6 Properties of triangle, basic formulae only

Unit-4

Function, Limit & Continuity, Derivative

4.1 **Function**   **2 Hours**

4.1.1 Definition of variables & constants

4.1.2 Definition of function with examples, domain and range of a function

4.1.3 Types of functions (even-odd, increasing-decreasing, inverse, periodic) with simple examples

4.1.4 Graph of trigonometric functions, sin x, cos x, tan x only

4.2 **Limit & Continuity**   **2 Hours**

4.2.1 Definition of limit (with left hand limit & right hand limit), Fundamental Theorem on limit (only statement), standard limits and simple problems

4.2.2 Continuity of functions, elementary test for continuity of functions (finite limit)

4.3 **Derivative**   **8 Hours**

4.3.1 Definition of derivatives

4.3.2 Derivatives of standard functions

4.3.3 Rules of differentiation of sum, difference, product and quotient of functions.

4.3.4 Derivatives of composite functions (Chain Rule)

4.3.5 Derivatives of inverse circular functions, implicit functions and logarithmic differentiation

4.3.6 Derivative of parametric functions, derivative of a function with respect to another function

4.3.7 Second order derivatives with simple problems

4.3.8 Application of derivatives –Physical & Geometrical interpretation of derivative, checking increasing-decreasing functions, finding velocity & acceleration, Maxima-Minima of function of single variable with simple problems.

Examination Scheme:

A. Semester Examination pattern of 60 marks:

1. Objective questions- 20 marks (1 mark each question), (At least 5 question from each **group**)
2. Subjective questions- 40 marks (at least 2 questions of 10 marks from each **group**)

- **Group- A** contains Unit-1 & Unit-2 (At least 40 marks); **Group-B** contains Unit-3 (At least 20 marks); **Group-C** contains Unit-4(At least 20 marks)

N.B.- Student will answer objective type questions of 20 marks and for subjective question of 40 marks, taking at least one question from each **group** of the above three **groups**.

B. For the internal Assessment 40 marks:

1. Class Test Examination/Internal Examination; 20 marks; choose best two out of three Class Test Examinations/ Internal Examinations
2. Class Attendance; 10 marks
3. Viva/ Quiz/Presentation/Assignment/Project/Report etc.; 10 marks

Text Books & Reference -

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics, Konch & Dey, Bhagabati Publication
3. Engineering Mathematics, Babu Ram, Pearson
4. Trigonometry, S.L.Loney, S.Chand & Co.
5. Higher Algebra, H. S. Hall & Knight, Book Palace, New Delhi
6. Advanced Engineering Mathematics, E. Kreyszig, Wiley
7. Engineering Mathematics, A. Sarkar, Naba Publication
8. Diploma Engineering Mathematics, B. K. Paul, U.N.Dhar & Sons
9. Analytic Geometry Two & Three Dimensional and **Vector Analysis**, R. M. Khan, New Central Book Agency
10. Higher Algebra: Classical, S.K. Mapa, Sarat Book House
11. Introduction to Real Analysis, S.K. Mapa, Sarat Book House
12. Engineering Mathematics, Reena Garg, Khanna Publishing House, New Delhi
13. Calculus and Analytic Geometry, G. B. Thomas, R. L. Finney, Addison Wesley
14. Engineering Mathematics, V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Vikas Publishing House.
15. Advanced Engineering Mathematics, Reena Garg & Chandrika Prasad, Khanna Publishing House, New Delhi
16. Web portal: https://www.ndl.gov.in/homestudy/science
    https://ncertbooks.ncert.gov.in/login
    https://epathshala.nic.in//
    https://webscte.co.in/
    https://en.wikipedia.org/wiki/
    https://openlibrary.org/
    https://www.youtube.com/
    http://content.inflibnet.ac.in/
    https://doabooks.org/
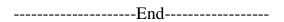   https://www.oapen.org/home
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Applied Physics for Sem-I (Theory)

Reviewed and prepared by Syllabus-Sub-committee, on the basis of recommendation of AICTE

Sem –I (Theory)

Course Code	:	BS103
Course Title	:	Applied Physics-I
Number of credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Physics
Course Category	:	BS

Course Content:

Unit 1: Physical world, Units and Measurements

Physical quantities; fundamental and derived, Units and systems of units (CGS and SI units),

Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis.

Measurements: Need, measuring instruments, least count, types of Measurement (direct, indirect), Errors in Measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.

Unit 2: Force and Motion

Force, Momentum, Conservation of linear momentum, its applications such as recoil of gun, numerical problems rockets (concept only), Impulse and impulsive force.

Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period, relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical), concept of Centripetal and centrifugal forces with examples (No derivation, only formula) banking of roads and bending of cyclist,concept and formula and numerical problems.

Unit 3: Work, Power and Energy

Work: Concept and units, examples of zero work, positive and negative work

Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications, Work done in moving an object on rough inclined plane.

Energy and its units, kinetic energy and potential energy, Conservation of mechanical energy for freely falling bodies(simple numerical problems), transformation of energy (examples only).

Power and its units, power and work relationship, calculation of power (numerical problems).

Unit 4: Rotational Motion

Translational and rotational motion with examples, Definition of torque and angular momentum and their relation, Conservation of angular momentum (quantitative) and its applications.

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, ring and sphere (hollow and solid); (Formulae only). Simple numerical problems.

Unit 5: properties of Matter

Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve.

Surface tension: Concept, units, cohesive **and adhesive forces**, angle of contact, Capillary rise (formula only), applications of surface tension, effect of temperature and impurity on surface tension.

Viscosity and coefficient of viscosity: terminal velocity, Stoke's law and effect of temperature on viscosity.

Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynol**d**'s number Equation of continuity, Bernoulli's Theorem (only formula and numericals) and its applications (mention name only).

Unit 6: <u>Heat and Thermometry</u>

Concept of heat and temperature, basic concepts of measurements of heat and temperature, modes of heats transfer (conduction, convection and radiation with examples), Co-efficient of thermal conductivity simple numerical problems.

Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions of solids and relation amongst them, specific heats Cp & Cv of a gas and their relationship (Mention only).

<u>References:</u>

1. Text Book of Physics for Class XI& XII (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. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
5. Engineering Physics by DK Bhattacharya & Poonam Tandan; Oxford University Press, New Delhi
6. Comprehensive Practical Physics, Vol,I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
7. Practical Physics by C.L. Arora, S. Chand Publication.
8. Comprehensive Physics Vol,I & II.

Applied Physics for Sem-I (Lab)

Course Code	:	BS107
Course Tittle	:	Applied Physics-I Labs
Numbers of Credits	:	1 (L:0, T:0, P:2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

List of Practical's/Activities(To perform minimum 8 practical's).

1. To measure the volume of the material of a given hollow cylinder, using a Vernier calipers.
2. To determine the area of cross section of a thin wire using a screw gauge.
3. To determine radius of curvature of a convex and a concave mirror/ surface using a spherometer.
4. To find the co-efficient of friction between wood and glass using a horizontal board.
5. To determine force constant of a spring using Hook's law.
6. To find the moment of inertia of a flywheel.
7. To find the viscosity of a given liquid (Glycerin) by Stoke's law
8. To find the co-efficient of linear expansion of the material of a rod.
9. To **verify** Boyle's law.
10. To determine the relative density of sand by using a sp. gr. Bottle.

Reference books:

1. Text books of Physics for Class-XI & XII (Part-I & II); N.C.E.R.T., Delhi.
2. Comprehensive Practical Physics, Vol-I & II, JN Laxmi Publications (P) Ltd.,
3. Practical Physics by C.L. Arora, S. Chand Publication.

Applied Chemistry

Course Code	:	BS105
Course Title	:	Applied Chemistry
Number of Credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Chemistry
Course Category	:	BS

Course Objectives:

There are numerous number materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. On successful completion of this course content will enable technicians to understand, ascertain and analyse and properties of natural raw materials require for producing economical and eco-friendly finished products.

- Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications
- Solve the engineering problems using concept of Electrochemistry and corrosion.

Instruction on question setting:

- Question paper contains three groups A, B and C. Unit 1 and unit 2 are included in group A, unit 3 and unit 4 in group B, unit 5 in group C.
- 20 (twenty) number of questions are of objective types consisting of all groups, each carrying 1 (one) mark.
- 5 (five) questions are to be answered taking at least one from each group (each question carries 8 marks).

Course Content:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

  Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers - orbital concept. Shapes of s, p and d orbitals Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.

  Type of chemical bonding: ionic, covalent, metallic and hydrogen bonds. Example of each type. Hybridization, sp^3, sp^2, sp, example: $BeCl_2$, BF_3, CH_4, NH_3, H_2O; structure of diamond, graphite.

  Solution - idea of solute, solvent and solution, methods to express the concentration of solution- molarity (M = mole per liter), ppm, mass percentage, volume percentage and mole fraction.

- **Unit 2: Water**

  Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness.

  Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

  1) Water softening techniques - soda lime process, zeolite process and ion exchange process.
  2) Municipal water treatment (in brief only) - sedimentation, coagulation, filtration, sterilization.

  Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).

- **Unit 3: Engineering Materials**

Natural occurrence of metals - minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag, metallurgy - brief account of general principles of metallurgy. Extraction of iron from haematite ore using blast furnace, aluminium from bauxite along with reactions, reactions during copper extraction. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.

General chemical composition, composition based applications (elementary idea only details omitted):

Port land cement and hardening, Glasses Refractory and Composite materials.

Polymers - monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon - 6, nylon - 66, Bakelite only), rubber and vulcanization of rubber.

- **Unit 4: Chemistry of Fuels and Lubricants**

Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.

Proximate analysis and ultimate analysis of coal solid fuel

petrol and diesel - fuel rating (octane and cetane numbers),

Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

Lubrication - function and characteristic properties of good lubricant, classification with examples, lubrication mechanism - hydrodynamic and boundary lubrication, physical properties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.

- **Unit 5: Electro Chemistry**

Electronic concept of oxidation, reduction and redox reactions.

Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.

Elementary concept of pH and buffer.

Industrial Application of Electrolysis –
  - Electrometallurgy
  - Electroplating
  - Electrolytic refining.

Application of redox reactions in electrochemical cells –
  - Primary cells - dry cell,
  - Secondary cell - commercially used lead storage battery, fuel and Solar cells.

Introduction to Corrosion of metals –
  - definition, types of corrosion (chemical and electrochemical), H_2 liberation and O_2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.

Internal corrosion preventive measures –
  - Purification, alloying and heat treatment and

External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.

Applied Chemistry

Suggested Sessional work:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

  Assignments: Writing electronic configuration of elements up to atomic number 30 (Z= 30). Numerical on molarity, ppm, mass percentage, volume percentage and mole fraction of given solution.

  Seminar: 1. Quantum numbers,

  2. Discuss the metallic properties such as malleability, ductility, hardness, high melting point, conductance of heat and electricity, magnetic properties of metals.

  Projects: Model of molecules $BeCl_2$, BF_3, CH_4, NH_3, H_2O

- **Unit 2: Water**

  Assignments: Simple problems on hardness calculation.

  Seminar: 1. Quality and quantity requirement of water in house and industry.

  2. Quality of control measures of effluents (BOD & COD).

  Projects: Collect water samples from different water sources and measure of hardness of water.

- **Unit 3: Engineering Materials**

  Assignments: Preparation of table showing different ores of iron, copper and aluminium metals along with their chemical compositions and classify in to oxide sulphide halide ores.

  Seminar: Discuss the chemical reactions taking place in Blast Furnace in extraction of iron; Reactions occurring during extraction of copper and aluminium metals.

  Projects: Make table showing place of availability of different ores in India and show places on India map.

- **Unit 4: Chemistry of Fuels and Lubricants**

  Assignments: Calculation of HCV and LCV of fuel using fuel composition in Dulong's formula.

  Seminar: Chemical structure of fuel components influence on fuel rating.

  Projects: Mapping of energy recourses in India. Collection of data of various lubricants available in the market.

- **Unit 5: Electro Chemistry**

  Assignments: Simple problems on Faradays laws of electrolysis.

  Seminar: 1. Corrosion rate and units.

  2. Corrosion preventions.

  Projects: Mapping of area in India prone to corrosion. Collection of data of various electrochemical cells batteries used in equipment and devices and available in market. Visit to sites such as Railway station to watch corrosion area in railways and research establishment in and around the institution.

References/Suggested Learning Resources:
(a) Books:
1) Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2) Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
3) C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
4) S. S. Dara & S.S.Umare, Engineering Chemistry, S. Chand. Publication, New Delhi, New Delhi, 2015.
5) Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
6) S. Vairam, Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
7) G. H. Hugar & A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. l and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
8) Rajesh Agnihotri, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

(b) Open source software and website address:
1) www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
2) www.visionlearning.com (Atomic structure and chemical bonding)
3) wwwcheml.com (Atomic structure and chemical bonding)
4) https://www.wastewaterelearning.com/elearning/ (Water Treatment)
5) www.capital-refractories.com (Metals, Alloys, Cement, and Refractory Materials)
6) www.em-ea.org/guide%20books/book-2/2.1%20fuels%20and%20combustion.pdf (Fuel and Combustion)
7) www.chemcollective.org (Metals, Alloys)
8) www.wqa.org(Water Treatment)

Applied Chemistry Lab

Course Code	:	BS109
Course Title	:	Applied Chemistry Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:
There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

LIST OF PRACTICALS:

Perform any 12 (twelve) Laboratory Practicals:
Volumetric and Gravimetric analysis.

1. Preparation of standard oxalic acid and standard potassium dichromate solution.
2. To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution and phenolphthalein as indicator.
3. Standardization of potassium permanganate solution using standard oxalic acid and determination of percentage of iron present in given Hematite ore by $KMnO_4$ solution
4. a) Standardization of sodium thiosulphate using standard potassium dichromate solution by IODOMETRY.

    b) Iodometric estimation of copper in copper pyrite ore.
5. Volumetric estimation of total acid number (TAN) of given oil.
6. Volumetric estimation of
    a. Total hardness of given water sample using standard EDTA solution.
    b. Alkalinity of given water sample using 0.01N sulphuric acid.
7. Proximate analysis of coal
    a. Gravimetric estimation moisture in given coal sample.
    b. Gravimetric estimation ash in given coal sample

Instrumental analysis

8. Determine the conductivity of given water sample.
9. Determination of the Iron content in given cement sample using colorimeter.
10. Determination of viscosity of lubricating oil using Redwood viscometer.
11. Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
12. To verify the first law of electrolysis of copper sulfate using copper electrode.
13. Construction and measurement of emf of electrochemical cell (Daniel cell).
14. To study the effect of dissimilar metal combination on cell emf.
15. To apply thin layer chromatography for separation of mixture of inorganic/organic compounds.
16. Qualitative detection of ARSENIC in a given sample of water (~5 ppm solution of sodium arsenite)
17. Determination of dissolved oxygen in a sample of water.
18. Determination of pH value of unknown solution.

Reference book
    VOGELS INORGANIC QUANTITATIVE ANALYSIS.

Members present in Syllabus Committee:
1. **Dr. Ujjval Kumar Bhattacharyya** (convener, lecturer, North Calcutta Polytechnic).
2. **Dr. Gandhi Kumar Kar** (Professor and head of the Dept. of Chemistry, Presidency University, Kolkata)
3. **Dr. Shyamal Kumar Chattopadhyay** (Professor IIEST, Shibpur).
4. **Dr. Mrinal Kanti Bain**, lecturer, Calcutta Technical School.
5. **Dr. Dipankar Maity**, lecturer, Birla Institute of Technology.
6. **Dr. Ranjal Paul**, Sr. Manager, Sun Pharmaceuticals Baroda.
7. **Prolay Roy,** lecturer, Memari Government Polytechnic.

Syllabus of Communication Skills in English

{The syllabus for the subject has been prepared by the Syllabus Sub-committee for the subject "Communication Skills in English" in accordance with the following instructions / directions received from Mr. B. Samanta (WBSCTVESD) vide his mail dated Dec. 6, 2019 at 12.04 PM}:-

"A meeting was held on 31.10.2019 at the Council. In the meeting following decisions were taken by the Council
1.   It was decided unanimously to adopt the curriculum structure of the AICTE model syllabus 2019(attached) for all diploma courses of WBSCTVESD.
2.   New curriculum structure and syllabus of diploma courses shall be prepared as per AICTE model Syllabus 2019 and implemented from the next academic session i.e. 2020-21 in phase manner.
3.   Content of the syllabus of diploma courses shall be customized as per the requirement and as per the advice of the syllabus sub- committee."

Sl. No.	Code No.	Course Title	Hours per week (Total-4)			Semester	Credits
			Lecture	Tutorial	Practical		
1	HS 101	Communication Skills in English	2	0	0	1	2
2	HS105	Communication Skills in English - Lab	0	0	2	1	1
Total number of weeks – 17 (seventeen)							

Preamble:

Engineering is a service, and therefore it exists to meet human needs. Needs are communicated through language. No engineer, no matter how brilliant, can do a good job if she or he does not know what the job is for, who they are serving, for what purpose, and what needs to be done to render this service. Feedback also has to be communicated in language: figures are not enough without explanation. Communication, spoken or written, is thus essential for any service provider to do their job.

However, in most cases the courses and syllabi offered to STEM undergraduates do not adequately address the need to make them good communicators. It is often assumed that this question has been addressed by schooling, or they attempt to adapt liberal arts courses to the needs of STEM workers, thereby failing to address those needs. In a country such as India where language learning in general and English learning in particular tend to be neglected or mis-taught, this problem is compounded. To be successful, communicative language learning has to be a two way process, with communication between the teacher and student, and between students. However, the culture of student passivity in the classroom which prevails in India is poor soil for these skills to take root.

We have therefore attempted in this course to produce a system that allows, (within the known constraints) even in a limited form, for project work and conversations, collaboration and role-play, to mitigate the 'keep quiet' culture of the Indian classroom and to encourage young people to find their voices. Polytechnic, College and university students are just one small step away from becoming young professionals, and once they take that step their livelihoods (and also the safety and happiness of their clients) will depend upon how well they can ask and answer questions in the real world.

Without adequate practice, confidence-building and positive reinforcement, the practice of teaching them the pedantic small points of the rules of English grammar, or obsessing over their pronunciation, only serves to silence them further. What they need is an environment where they can communicate with each other and then troubleshoot the results, go over bad communication and make it better, identify their mistakes and correct them without being terrorised by cultural stereotypes. Graduate education should be a safe space for them to do this before work in the real world attaches real penalties to the results of bad communication. With this syllabus and attached guidelines, we have tried to take a small step in the right direction.

Course Title: **Communication Skills in English**

Course Code No.:   **HS101**

Hours per week: **02 (Lecture), Total contact hours / week: 02**

Credits: **02**

Course Objectives (AICTE): Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus the main objectives of this course are:

- To develop confidence in speaking English with correct pronunciation
- To develop communication skills of the students i.e. listening, speaking, reading and writing skills
- To introduce the need for personality development – Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc.

Course Content (Theory)
Unit – 1 Communiucation: Theory and Practice

- Basics of communication: Introduction, meaning and definition, process of communication etc.
- Types of communication: formal and informal, verbal, non-verbal and written. Barriers to effective communication
- 7 Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).
- Art of Effective communication,

- o Choosing words
- o Voice
- o Modulation
- o Clarity
- o Time
- o Simplification of words

- Technical Communication

Unit – 2 Soft Skills for Professional Excellence

- Introduction: Soft Skills and Hard Skills.
- Importance of Soft Skills.
- Life skills: Self-awareness and Self-analysis, adaptability, social skills, emotional intelligence, Interpersonal relationship and empathy etc.
- Applying soft skills across cultures – Corporate work culture, Work persona, Professionalism, Time Management
- Case Studies

Unit – 3: Reading Comprehension

Note Taking, Comprehension, vocabulary enhancement and grammar exercises based on reading of texts.

Unit – 4: Professional Writing

The art of writing Report and Memo
CVs
Letters: Job Application and Business
Drafting e-mail, minutes of a meeting, etc

Unit – 5: Vocabulary and Grammar

Remedial Grammar and Exercises
Professional Workplace Communication
Parts of speech, active and passive voice, tenses etc.

Course outcomes (AICTE):
At the end of this course, the participants will:

- Develop basic speaking and writing skills including proper usage of language and vocabulary so that they can become highly confident and skilled speakers and writers.
- Be informed of the latest trends in basic verbal activities such as presentations, facing interviews and other forms of oral communication.
- Also develop skills of group presentation and communication in team.
- Develop non-verbal communication such as proper use of body language and gestures

Course Title: Communication Skills in English - Lab

Course Code No.: HS105

Hours per week: 02 (Practical), Total contact hours / week: 02

Credits: 01

Course Objectives (AICTE):

Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus the main objectives of this course are:

1. To develop listening skills for enhancing communication.
2. To develop speaking skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality development – Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills, etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content:

Unit – 1:
Basic Common Communication Problems and their Solutions

Unit – 2:
Introduction to Phonetics
Sounds: consonant, vowel. Transcription of words (IPA), weak forms etc.

Unit – 3:
Speaking and Listening Skills
Standard and Formal Speech: Oral presentations, Group Discussions, Public Speaking, Business presentations etc. Conversation practice and role playing, Job interviews, Note taking etc.

Unit – 4:
Non-verbal Communication
Proxemics, Haptics and Kinesics

Members of the Syllabus Sub-committee for *Communication Skills in English:-*

1. Prof. Rimi B. Chatterjee (Expert),
   Professor, Department of English, Jadavpur University and former Professor of English at IIT, Kharagpur, West Bengal.
   (Prof. Chatterjee, the subject expert, has wide ranging experience in teaching Communication Skills in English to Engineering students, both in IIT, Kanpur and Jadavpur University).
2. Ms. Purna Biswas (Member), Lecturer in Humanities, EIJE, Dalalpukur, Howrah
3. Mr. Santanu Mitra (Member), Lecturer in Humanities, Women's Polytechnic, Kolkata
4. Mr. Hemadri Chatterjee (Convener), Lecturer in Humanities, Ramakrishna Mission Shilpapitha, Belgharia, Kolkata

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Proposed Syllabus for Engineering Graphics

Name of the Course :	Engineering Graphics	
Course Code :	Semester : First	
Duration : 17 Weeks	Maximum Marks :	: 100
Lecture : Nil	Assignment	: 20
	Class Performance	: 20
Tutorial : Nil	Viva Voce	: 10
	Attendance	: 10
Practical : 3 hrs./week	External (Viva, Sketch Book & Drawing Sheet)	: 40
Credit : 1.5		

Aim :
1. The Course is aimed to develop the basic graphic skills so that the students can prepare Engineering Drawing in their practical field.
2. Understand the fundamentals of Engineering Graphics.
3. Read and interpret object drawing.
4. To develop the skills of Computer Aided Drafting and can easily cope up the skill of drafting for modern drawing offices/industries.

Objectives :
1. To develop sense of Scale and drawing technique of different curves and their application.
2. To develop drafting and sketching skills, to know the applications of drawing equipment and get familiarize with Indian Standards related to engineering drawing.
3. To develop concept of Orthographic Projection and to draw Orthographic Views for different objects.
4. To visualize three dimensional objects from Orthographic Views and to draw isometric views/projections.
5. To be familiar with AutoCAD and to develop the skill of drafting in AutoCAD by using different commands.

Pre-requisites :
1. Unambiguous and clear visualization.
2. Sound Pictorial Intelligence.

Unit No.	Contents
Unit 1	1.1 Letters and numerals (Single Stroke Vertical) 1.2 Conventions of lines and their applications 1.3 Concept of Representative Fraction (R.F), Reduced scale, Enlarged scale & Full Scale, Engineering Scale such as Plain Scale & Diagonal Scale. 1.4 Dimensional Techniques - Unidirectional System and Aligned System.

Unit 2	2.1 Geometrical Construction :
	  a)Draw Regular Polygons, Ellipse, Parabola, hyperbola
	  b) Draw Curve passing through given no. of points, cycloid, involute of a circle and polygon

Unit 3	3.1 Introduction to Orthographic Projection : Concept of First Angle & Third Angle of projection. Projections of lines(limited to both ends in 1st quadrant) : parallel to the reference planes, inclined to the reference planes (1st Angle Method) 3.2 Projections of solid body: Regular Polygonal Pyramid, Cylinder, Cone - inclined to only one reference plane (1st Angle Method)

Unit 4	4.1 Conversion of Pictorial Views into orthographic views (Simple Objects &First Angle Projection Method Only)
Unit 5	5.1 Introduction to Isometric Projections, Concept of Isometric Scale and Isometric Views 5.2 Conversion of Orthographic views into Isometric Views/Projections : Simple Objects e.g. regular prism, pyramid, cone, cylinder.
Unit 6	6.1 Free hand sketches of engineering elements such as thread profile, nuts, bolts, studs, set screws, washers, locking arrangements etc. and their conventional representation (For branches other than Mechanical Engineering, the teachers should select branch specific elements for free hand sketching)

Unit 7	7.1 Introduction to different commands and toolbars of AutoCAD
	   a) Draw command : Lines, Circle, Polygon, Arc, Ellipse, Polyline, Fillet, Chamfer, Hatch, Array (Rectangular & Polar) etc.
	   b) Modify Command : Offset, Trim, Extend, Erase, Fillet, Chamfer, Break, Lengthen, Copy, Move, Mirror, Stretch, Match Properties, Pedit etc.
	   c) View : Zoom All, Zoom Window, Zoom Extent etc.
	   d) Dimensioning : Dimension Setting, Linear, Aligned, Radial, Diameter, Leader, Angular etc.
	   c) Text : Text Style, Dtext, Mtext, DDedit etc.
	   d) Format : Limits, Layers, Pan etc.
	7.2 Making a few simple 2D drawings in AutoCAD.

Sl. No.	Practical Exercise	Unit No.	Hrs.
1	Draw horizontal, vertical, 30˚, 45˚, 60˚, 75˚, different types of lines, dimensioning styles using Tee and Set Squares / Drafters. (Do this exercise in Sketch Book)	1	02
2	Write single stroke vertical alphabets and numerical (7:4 ratio) (Do this exercise in Sketch Book)	1	02
3	Draw regular geometric constructions and redraw/copy the given figure (Do this exercise in Sketch Book)	1	02
4	Draw at least two problems on plain scale and two problems on diagonal scales (Do this exercise in Sketch Book)	1	03
5	Draw problems on ellipse, parabola, involute and cycloid (Do this exercise in Sketch Book)	2	06
6	Draw at least two problems on lines and two problems on solid (First Angle Projection method) (Do this exercise in A2 size drawing sheet)	3	09
7	Plan, Elevation and Side View of at least two pictorial views to be drawn on one A2 size Drawing Sheet along with dimensions	4	06
8	At least Two Isometric Views and two Isometric Projections to be drawn on one A2 size Drawing Sheet	5	06

9	Draw free hand sketches / conventional representation of machine elements such as thread profile, nuts, bolts, studs, set screws, washers, locking arrangements etc.	6	03
10	Simple geometrical figures such as triangle, rectangle, polygon, circle, ellipse, and simple orthographic views of brackets, gaskets etc. to be drawn in AutoCAD and Printout to be taken on A4 size Sheet. At least two sheets to be prepared.	7	12
	Total Period		51

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
N.D.Bhatt	Engineering Drawing	53rd Edition	Charotkar Publishing House
R.K.Dhawan	Engineering Drawing	Revised Edition 2015	S.Chand & Co.
K. Venugopal & V. Prabhuraja Raja	Engineering Drawing and Graphics + AutoCAD		New Age Publication

Reference Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
S.N. Lal	Engineering Drawing		CENGAGE
Basant Agrawal & C M Agrwal	Engineering Drawing		Tata McGrew Hill
Dhananjay A Jolhe	Engineering Drawing with an Introduction to AutoCAD		Tata McGrew Hill
S.P.Dey	AutoCAD 2014		Vikas Publisher
P.S. Gill	Engineering Drawing		S.K.Kataria & Sons.

References :

1.Engineering Graphics Syllabus of AICTE Model Curriculum 2019.

2. Syllabus of Technical Drawing (Old) of W.B.S.C.T.E

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to sites such as Railway station and research establishment around the institution.

Learning Outcomes:

At the end of the course student will be able to

- To express quantitative measurements accurately.
- To practice and adapt good measuring techniques.
- To use various apparatus for precise measurements.
- To understand and differentiate different methods of quantitative analysis.
- To know and understand principles of quantitative analysis using instruments.
- To construct different electrochemical cells used in developing batteries.
- To understand and appreciate methods of corrosion abetments.

Reference Books:

1. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
4. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

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Course Code	:	HS103
Course Title	:	Sports and Yoga
Number of Credits	:	1(L:0,T:0,P:2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:

- To make the students understand the importance of sound health and fitness principles as they relate to better health.
- To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
- To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
- To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Course Content:

- **Introduction to Physical Education**

  o Meaning & definition of Physical Education

  o Aims & Objectives of Physical Education

  o Changing trends in Physical Education

- **Olympic Movement**

  o Ancient & Modern Olympics (Summer & Winter)

  o Olympic Symbols, Ideals, Objectives & Values

  o Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)

- **Physical Fitness, Wellness & Lifestyle**

  o Meaning & Importance of Physical Fitness & Wellness

  o Components of Physical fitness

  o Components of Health related fitness

  o Components of wellness

  o Preventing Health Threats through Lifestyle Change

  o Concept of Positive Lifestyle

- **Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**

  o Define Anatomy, Physiology & Its Importance

  o Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)

- **Kinesiology, Biomechanics & Sports**

  o Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports

  o Newton's Law of Motion & its application in sports.

  o Friction and its effects in Sports.

- **Postures**

  o Meaning and Concept of Postures.

  o Causes of Bad Posture.

  o Advantages & disadvantages of weight training.

  o Concept & advantages of Correct Posture.

  o Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis.

  o Corrective Measures for Postural Deformities

- **Yoga**

  o Meaning & Importance of Yoga

  o Elements of Yoga

  o Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas

  o Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana)

  o Relaxation Techniques for improving concentration - Yog-nidra

- **Yoga & Lifestyle**

  o Asanas as preventive measures.

  o Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana.

  o Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.

  o Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.

  o Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana.

  o Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

- **Training and Planning in Sports**

  o Meaning of Training

  o Warming up and limbering down

  o Skill, Technique & Style

  o Meaning and Objectives of Planning.

  o Tournament – Knock-Out, League/Round Robin & Combination.

- **Psychology & Sports**

  o Definition & Importance of Psychology in Physical Edu. & Sports

  o Define & Differentiate Between Growth & Development

  o Adolescent Problems & Their Management

  o Emotion: Concept, Type & Controlling of emotions

  o Meaning, Concept & Types of Aggressions in Sports.

  o Psychological benefits of exercise.

  o Anxiety & Fear and its effects on Sports Performance.

  o Motivation, its type & techniques.

  o Understanding Stress & Coping Strategies.

- **Doping**
  - Meaning and Concept of Doping
  - Prohibited Substances & Methods
  - Side Effects of Prohibited Substances

- **Sports Medicine**
  - First Aid – Definition, Aims & Objectives.
  - Sports injuries: Classification, Causes & Prevention.
  - Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries

- **Sports / Games**

  Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.
  - History of the Game/Sport.
  - Latest General Rules of the Game/Sport.
  - Specifications of Play Fields and Related Sports Equipment.
  - Important Tournaments and Venues.
  - Sports Personalities.
  - Proper Sports Gear and its Importance.

References:
1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

Course Outcomes:

On successful completion of the course the students will be able to:
(i) Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
(ii) Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
(iii) Learn breathing exercises and healthy fitness activities
(iv) Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.
(v) Perform yoga movements in various combination and forms.
(vi) Assess current personal fitness levels.
(vii) Identify opportunities for participation in yoga and sports activities.
(viii) Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
(ix) Improve personal fitness through participation in sports and yogic activities.
(x) Develop understanding of psychological problems associated with the age and lifestyle.

(xi)   Demonstrate an understanding of sound nutritional practices as related to health and physical performance.

(xii) Assess yoga activities in terms of fitness value.

(xiii) Identify and apply injury prevention principles related to yoga and physical fitness activities.

(xiv) Understand and correctly apply biomechanical and physiological principles elated to exercise and training.

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Course Code	:	HS105
Course Title	:	Communication Skills in English - Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:
Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:

1. To develop listening skills for enhancing communication.

2. To develop speaking skills with a focus on correct pronunciation and fluency.

3. To introduce the need for Personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content:
Unit 1 Listening Skills
Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

Unit II Introduction to Phonetics
Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.

Unit III Speaking Skills
Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.

Unit IV Building vocabulary
Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to enhance self-expression and vocabulary of participants.

Recommended Readings:
1. Daniel Jones. *The Pronunciation of English.* Cambridge: Cambridge University Press, 1956.

2. James Hartman& et al. Ed. *English Pronouncing Dictionary.* Cambridge: Cambridge University

Subject: Workshop Practice I (Photography)

Sem: First

Sl.No

1. Basic communication and photography based terms should be known.
2. 2 Knowledge of basic technical and aesthetic concepts is also necessary.

Contents: Group:B, Total Periods: 45 (15 Weeks)+6 (2 Weeks)=51(17 Weeks)

Module : 1   1.0 Introduction to Photography Studio
    1.1 Acquaintance with Light-room equipments & tools viz. camera, light, lens, fitter, flash, exposure metre, drier, glazer, tripod etc
   1.2 **Introduction of digital SLR camera**

Module :2

   2.0 How to take passport photographs and it's lighting and exposure

Module : 3 **3.0 Portrait Photography-Different types of lighting, backdrop, exposure**

   metre

Module : 4 **4.0 Practice in shooting subjects for outdoor & indoor photography**

   4.1 Practice in shooting subjects for outdoor photography with the help of in-built and hand-held exposure meter.

   4.2 Practice in shooting subjects for indoor photography with the help of in-built and hand-held exposure meter.

Module : 5 **5.0 Product photography- Table-top, props, lighting, accessories, soft-box, umbrella, reflector etc**

Multimedia Technology - Semester I

Sl No.	Category of courses	Course Title	L	T	P	Contact Hours	Credit	Marks
1	Basic Science	Mathematics-I	2	1	0	3	3	100
2	Basic Science	Applied Physics-I	2	1	0	3	3	100
3	Basic Science	Applied Chemistry	2	1	0	3	3	100
4	Humanities & Social Science	Communication Skills in English	2	0	0	2	2	100
5	Engg. Science	Engineering Graphics	0	0	3	3	1.5	100
6	Engg. Science	Mulmedia Workshop Practice	0	0	3	3	1.5	100
7	Basic Science	Applied Physics-I Lab	0	0	2	2	1	100
8	Basic Science	Applied Chemistry Lab	0	0	2	2	1	100
9	Humanities & Social Science	Sports and Yoga	0	0	2	2	1	100
10	Humanities & Social Science	Communication Skills in English Lab	0	0	2	2	1	100
Total Credits and Marks							18	1000

Multimedia Technology - Semester II

Sl No.	Category of courses	Course Title	L	T	P	Contact Hours	Credit	Marks
1	Basic Science	Mathematics II	3	1	0	4	4	100
2	Basic Science	Applied Physics II	2	1	0	3	3	100
3	Engg. Science	Introduction to IT Systems	2	0	0	2	2	100
4	Engg. Science	Multimedia Fundamentals	2	1	0	3	3	100
5	Engg. Science	Introduction to Graphics Design	2	1	0	3	3	100
6	Basic Science	Applied Physics II Lab	0	0	2	2	1	100
7	Engg. Science	Introduction to IT Systems Lab	0	0	4	4	2	100
8	Engg. Science	Multimedia Fundamentals Laboratory	0	0	2	2	1	100
9	Engg. Science	Introduction to Graphics Design Laboratory	0	0	2	2	1	100
10	Audit	Environmental Science	2	0	0	2	0	100
Total Credits and Marks							20	1000

Syllabus for Engineering Mathematics-I

Course Title:	Engineering Mathematics-I
Course Code:	BS101/M-I
Number of Credits :	3(L: 2+1: T) P: 0
Pre Requisites :	1) Basic Formulae of Algebra, Trigonometry should be known 2) Preliminary knowledge of the vector
Total Contact Hours :	45 hrs.

Aim: Engineering Mathematics is the backbone of engineering students. The curriculum of mathematics has undergone changes from time to time in accordance with the need of engineering branches. The revised syllabus has been designed keeping in view the emerging needs of all categories of students. Great emphasis has been laid on the application of various contents like algebra, complex numbers, vectors, trigonometry and derivative. This course will develop analytical abilities to make exact calculations and provide a continuing educational base for the students.

Course Objectives: After the completion of the course the students will be able to

➢ apply the basic concepts of logarithm, complex number, quadratic equation and binomial theorem for solving the engineering and practical problems.

➢ find the solutions of vector oriented problems like work done, moment etc by applying vector algebra.

➢ simplify trigonometric expressions and solve trigonometric equations which will be useful in solving the scientific problems.

➢ analyze limit, continuity, derivatives of different functions and physical interpretation of derivatives which will be applicable in real situation.

Course Content

Unit-1

Algebra

1.1 Logarithm: 3 Hours

1.1.1 Definition of natural and common logarithm.

1.1.2 General Properties of logarithm and simple problems

1.2 Complex Numbers: 5 Hours

1.2.1 Definition of Complex numbers, Real and Imaginary parts of a complex number, Equality of two complex numbers, Conjugate of a complex number

1.2.2 Modulus and Argument of a complex number and simple problems

1.2.3 Polar and Cartesian forms of a complex number and their relation.

1.2.4 Algebraic operations (Addition, Subtraction, multiplication, Division) of complex numbers

1.2.5 De Moivre's Theorem (without proof) and simple problems.

1.2.6 Cube roots of unity and their properties with problems.

1.3 Quadratic Equations: 4 Hours

1.3.1 Definition of Quadratic Equations.

1.3.2 Finding the roots of a quadratic equation, conjugate roots& simple problems

1.3.3 Nature of the roots using discriminant & problems

1.3.4 Relation between roots and co-efficients & problems

1.3.5 Formation of quadratic equations if roots are given.

1.4 Binomial Theorem: 4 Hours

1.4.1 Definition of factorial of a number, permutation(n_{P_r})& combination (n_{C_r}) with formula only

1.4.2 Binomial Theorem (without proof) for any index, simple problems on positive index only

1.4.3 General Term and Middle Term and problems

1.4.4 Expansion of$(1 + x)^{-1}, (1 - x)^{-1}, where |x| < 1$, exponential & logarithmic series only (no problem)

Unit-2

Vector Algebra 7 Hours

2.1 Definition of vector and types of vectors

2.2 Concept of a position vector and Ratio formula& simple problems

2.3 Rectangular resolution of a vector

2.4 Equality, addition, subtraction of vectors and multiplication of a vector by a scalar

2.5 Scalar (dot) and Vector (cross) product of two vectors with properties & simple problems

2.6 Application of dot product -- work done by a force, projection of a vector upon another

2.7 Application of cross product -- finding area of a triangle and parallelogram, moment of a force

Unit-3

Trigonometry   10 Hours

3.1 Concept of trigonometrical angles, measurement of angles in degree, radian and grade & their relation only.

3.2 Trigonometrical ratios of angles, associated angles, Trigonometric ratios of some standard angles, problems

3.3 Compound angles formula (without proof), multiple, sub-multiple angles & simple problems

3.4 Solutions of Trigonometrical Equations, simple problems (angle lies between 0 and 2π)

3.5 Inverse Circular Function & simple problems

3.6 Properties of triangle, basic formulae only

Unit-4

Function, Limit & Continuity, Derivative

4.1 **Function**   2 Hours

4.1.1 Definition of variables & constants

4.1.2 Definition of function with examples, domain and range of a function

4.1.3 Types of functions (even-odd, increasing-decreasing, inverse, periodic) with simple examples

4.1.4 Graph of trigonometric functions, sin x, cos x, tan x only

4.2 **Limit & Continuity**   2 Hours

4.2.1 Definition of limit (with left hand limit & right hand limit), Fundamental Theorem on limit (only statement), standard limits and simple problems

4.2.2 Continuity of functions, elementary test for continuity of functions (finite limit)

4.3 **Derivative**   8 Hours

4.3.1 Definition of derivatives

4.3.2 Derivatives of standard functions

4.3.3 Rules of differentiation of sum, difference, product and quotient of functions.

4.3.4 Derivatives of composite functions (Chain Rule)

4.3.5 Derivatives of inverse circular functions, implicit functions and logarithmic differentiation

4.3.6 Derivative of parametric functions, derivative of a function with respect to another function

4.3.7 Second order derivatives with simple problems

4.3.8 Application of derivatives –Physical & Geometrical interpretation of derivative, checking increasing-decreasing functions, finding velocity & acceleration, Maxima-Minima of function of single variable with simple problems.

Examination Scheme:

A. Semester Examination pattern of 60 marks:

1. Objective questions- 20 marks (1 mark each question), (At least 5 question from each **group**)
2. Subjective questions- 40 marks (at least 2 questions of 10 marks from each **group**)

- **Group- A** contains <u>Unit-1 & Unit-2</u> (At least 40 marks); **Group-B** contains <u>Unit-3</u> (At least 20 marks); **Group-C** contains <u>Unit-4</u>(At least 20 marks)

N.B.- Student will answer objective type questions of 20 marks and for subjective question of 40 marks, taking at least one question from each **group** of the above three **groups**.

B. For the internal Assessment 40 marks:

1. Class Test Examination/Internal Examination; 20 marks; choose best two out of three Class Test Examinations/ Internal Examinations
2. Class Attendance; 10 marks
3. Viva/ Quiz/Presentation/Assignment/Project/Report etc.; 10 marks

Text Books & Reference -

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics, Konch & Dey, Bhagabati Publication
3. Engineering Mathematics, Babu Ram, Pearson
4. Trigonometry, S.L.Loney, S.Chand & Co.
5. Higher Algebra, H. S. Hall & Knight, Book Palace, New Delhi
6. Advanced Engineering Mathematics, E. Kreyszig, Wiley
7. Engineering Mathematics, A. Sarkar, Naba Publication
8. Diploma Engineering Mathematics, B. K. Paul, U.N.Dhar & Sons
9. Analytic Geometry Two & Three Dimensional and **Vector Analysis**, R. M. Khan, New Central Book Agency
10. Higher Algebra: Classical, S.K. Mapa, Sarat Book House
11. Introduction to Real Analysis, S.K. Mapa, Sarat Book House
12. Engineering Mathematics, Reena Garg, Khanna Publishing House, New Delhi
13. Calculus and Analytic Geometry, G. B. Thomas, R. L. Finney, Addison Wesley
14. Engineering Mathematics, V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Vikas Publishing House.
15. Advanced Engineering Mathematics, Reena Garg & Chandrika Prasad, Khanna Publishing House, New Delhi
16. Web portal: https://www.ndl.gov.in/homestudy/science
    https://ncertbooks.ncert.gov.in/login
    https://epathshala.nic.in//
    https://webscte.co.in/
    https://en.wikipedia.org/wiki/
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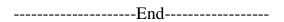   https://www.oapen.org/home
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Applied Physics for Sem-I (Theory)

Reviewed and prepared by Syllabus-Sub-committee, on the basis of recommendation of AICTE

Sem –I (Theory)

Course Code	:	BS103
Course Title	:	Applied Physics-I
Number of credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Physics
Course Category	:	BS

Course Content:

Unit 1: Physical world, Units and Measurements

Physical quantities; fundamental and derived, Units and systems of units (CGS and SI units),

Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other, checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis.

Measurements: Need, measuring instruments, least count, types of Measurement (direct, indirect), Errors in Measurements (systematic and random), absolute error, relative error, error propagation, error estimation and significant figures.

Unit 2: Force and Motion

Force, Momentum, Conservation of linear momentum, its applications such as recoil of gun, numerical problems rockets (concept only), Impulse and impulsive force.

Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period, relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical), concept of Centripetal and centrifugal forces with examples (No derivation, only formula) banking of roads and bending of cyclist,concept and formula and numerical problems.

Unit 3: Work, Power and Energy

Work: Concept and units, examples of zero work, positive and negative work

Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications, Work done in moving an object on rough inclined plane.

Energy and its units, kinetic energy and potential energy, Conservation of mechanical energy for freely falling bodies(simple numerical problems), transformation of energy (examples only).

Power and its units, power and work relationship, calculation of power (numerical problems).

Unit 4: Rotational Motion

Translational and rotational motion with examples, Definition of torque and angular momentum and their relation, Conservation of angular momentum (quantitative) and its applications.

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, ring and sphere (hollow and solid); (Formulae only). Simple numerical problems.

Unit 5: properties of Matter

Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve.

Surface tension: Concept, units, cohesive **and adhesive forces**, angle of contact, Capillary rise (formula only), applications of surface tension, effect of temperature and impurity on surface tension.

Viscosity and coefficient of viscosity: terminal velocity, Stoke's law and effect of temperature on viscosity.

Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynol**d**'s number Equation of continuity, Bernoulli's Theorem (only formula and numericals) and its applications (mention name only).

Unit 6: <u>Heat and Thermometry</u>

Concept of heat and temperature, basic concepts of measurements of heat and temperature, modes of heats transfer (conduction, convection and radiation with examples), Co-efficient of thermal conductivity simple numerical problems.

Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions of solids and relation amongst them, specific heats Cp & Cv of a gas and their relationship (Mention only).

<u>References:</u>

1. Text Book of Physics for Class XI& XII (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. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
5. Engineering Physics by DK Bhattacharya & Poonam Tandan; Oxford University Press, New Delhi
6. Comprehensive Practical Physics, Vol,I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
7. Practical Physics by C.L. Arora, S. Chand Publication.
8. Comprehensive Physics Vol,I & II.

Applied Physics for Sem-I (Lab)

Course Code	:	BS107
Course Tittle	:	Applied Physics-I Labs
Numbers of Credits	:	1 (L:0, T:0, P:2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

List of Practical's/Activities(To perform minimum 8 practical's).

1. To measure the volume of the material of a given hollow cylinder, using a Vernier calipers.
2. To determine the area of cross section of a thin wire using a screw gauge.
3. To determine radius of curvature of a convex and a concave mirror/ surface using a spherometer.
4. To find the co-efficient of friction between wood and glass using a horizontal board.
5. To determine force constant of a spring using Hook's law.
6. To find the moment of inertia of a flywheel.
7. To find the viscosity of a given liquid (Glycerin) by Stoke's law
8. To find the co-efficient of linear expansion of the material of a rod.
9. To **verify** Boyle's law.
10. To determine the relative density of sand by using a sp. gr. Bottle.

Reference books:

1. Text books of Physics for Class-XI & XII (Part-I & II); N.C.E.R.T., Delhi.
2. Comprehensive Practical Physics, Vol-I & II, JN Laxmi Publications (P) Ltd.,
3. Practical Physics by C.L. Arora, S. Chand Publication.

Applied Chemistry

Course Code	:	BS105
Course Title	:	Applied Chemistry
Number of Credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Chemistry
Course Category	:	BS

Course Objectives:

There are numerous number materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. On successful completion of this course content will enable technicians to understand, ascertain and analyse and properties of natural raw materials require for producing economical and eco-friendly finished products.

- Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
- Use relevant water treatment method to solve domestic and industrial problems.
- Solve the engineering problems using knowledge of engineering materials and properties.
- Use relevant fuel and lubricants for domestic and industrial applications
- Solve the engineering problems using concept of Electrochemistry and corrosion.

Instruction on question setting:

- Question paper contains three groups A, B and C. Unit 1 and unit 2 are included in group A, unit 3 and unit 4 in group B, unit 5 in group C.
- 20 (twenty) number of questions are of objective types consisting of all groups, each carrying 1 (one) mark.
- 5 (five) questions are to be answered taking at least one from each group (each question carries 8 marks).

Course Content:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

  Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers - orbital concept. Shapes of s, p and d orbitals Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.

  Type of chemical bonding: ionic, covalent, metallic and hydrogen bonds. Example of each type. Hybridization, sp^3, sp^2, sp, example: $BeCl_2$, BF_3, CH_4, NH_3, H_2O; structure of diamond, graphite.

  Solution - idea of solute, solvent and solution, methods to express the concentration of solution- molarity (M = mole per liter), ppm, mass percentage, volume percentage and mole fraction.

- **Unit 2: Water**

  Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness.

  Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

  1) Water softening techniques - soda lime process, zeolite process and ion exchange process.
  2) Municipal water treatment (in brief only) - sedimentation, coagulation, filtration, sterilization.

  Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).

- **Unit 3: Engineering Materials**

Natural occurrence of metals - minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag, metallurgy - brief account of general principles of metallurgy. Extraction of iron from haematite ore using blast furnace, aluminium from bauxite along with reactions, reactions during copper extraction. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.

General chemical composition, composition based applications (elementary idea only details omitted):

Port land cement and hardening, Glasses Refractory and Composite materials.

Polymers - monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon - 6, nylon - 66, Bakelite only), rubber and vulcanization of rubber.

- **Unit 4: Chemistry of Fuels and Lubricants**

Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.

Proximate analysis and ultimate analysis of coal solid fuel

petrol and diesel - fuel rating (octane and cetane numbers),

Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.

Lubrication - function and characteristic properties of good lubricant, classification with examples, lubrication mechanism - hydrodynamic and boundary lubrication, physical properties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.

- **Unit 5: Electro Chemistry**

Electronic concept of oxidation, reduction and redox reactions.

Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.

Elementary concept of pH and buffer.

Industrial Application of Electrolysis –
- Electrometallurgy
- Electroplating
- Electrolytic refining.

Application of redox reactions in electrochemical cells –
- Primary cells - dry cell,
- Secondary cell - commercially used lead storage battery, fuel and Solar cells.

Introduction to Corrosion of metals –
- definition, types of corrosion (chemical and electrochemical), H_2 liberation and O_2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.

Internal corrosion preventive measures –
- Purification, alloying and heat treatment and

External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.

Suggested Sessional work:

- **Unit 1: Atomic Structure, Chemical Bonding and Solutions**

    Assignments: Writing electronic configuration of elements up to atomic number 30 (Z= 30). Numerical on molarity, ppm, mass percentage, volume percentage and mole fraction of given solution.

    Seminar: 1. Quantum numbers,

    2. Discuss the metallic properties such as malleability, ductility, hardness, high melting point, conductance of heat and electricity, magnetic properties of metals.

    Projects: Model of molecules $BeCl_2$, BF_3, CH_4, NH_3, H_2O

- **Unit 2: Water**

    Assignments: Simple problems on hardness calculation.

    Seminar: 1. Quality and quantity requirement of water in house and industry.

    2. Quality of control measures of effluents (BOD & COD).

    Projects: Collect water samples from different water sources and measure of hardness of water.

- **Unit 3: Engineering Materials**

    Assignments: Preparation of table showing different ores of iron, copper and aluminium metals along with their chemical compositions and classify in to oxide sulphide halide ores.

    Seminar: Discuss the chemical reactions taking place in Blast Furnace in extraction of iron; Reactions occurring during extraction of copper and aluminium metals.

    Projects: Make table showing place of availability of different ores in India and show places on India map.

- **Unit 4: Chemistry of Fuels and Lubricants**

    Assignments: Calculation of HCV and LCV of fuel using fuel composition in Dulong's formula.

    Seminar: Chemical structure of fuel components influence on fuel rating.

    Projects: Mapping of energy recourses in India. Collection of data of various lubricants available in the market.

- **Unit 5: Electro Chemistry**

    Assignments: Simple problems on Faradays laws of electrolysis.

    Seminar: 1. Corrosion rate and units.

    2. Corrosion preventions.

    Projects: Mapping of area in India prone to corrosion. Collection of data of various electrochemical cells batteries used in equipment and devices and available in market. Visit to sites such as Railway station to watch corrosion area in railways and research establishment in and around the institution.

References/Suggested Learning Resources:
(a) Books:
1) Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2) Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
3) C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
4) S. S. Dara & S.S.Umare, Engineering Chemistry, S. Chand. Publication, New Delhi, New Delhi, 2015.
5) Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
6) S. Vairam, Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
7) G. H. Hugar & A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. l and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
8) Rajesh Agnihotri, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.

(b) Open source software and website address:
1) www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
2) www.visionlearning.com (Atomic structure and chemical bonding)
3) wwwcheml.com (Atomic structure and chemical bonding)
4) https://www.wastewaterelearning.com/elearning/ (Water Treatment)
5) www.capital-refractories.com (Metals, Alloys, Cement, and Refractory Materials)
6) www.em-ea.org/guide%20books/book-2/2.1%20fuels%20and%20combustion.pdf (Fuel and Combustion)
7) www.chemcollective.org (Metals, Alloys)
8) www.wqa.org(Water Treatment)

Applied Chemistry Lab

Course Code	:	BS109
Course Title	:	Applied Chemistry Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:
There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

LIST OF PRACTICALS:

Perform any 12 (twelve) Laboratory Practicals:
Volumetric and Gravimetric analysis.

1. Preparation of standard oxalic acid and standard potassium dichromate solution.
2. To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution and phenolphthalein as indicator.
3. Standardization of potassium permanganate solution using standard oxalic acid and determination of percentage of iron present in given Hematite ore by $KMnO_4$ solution
4. a) Standardization of sodium thiosulphate using standard potassium dichromate solution by IODOMETRY.

b) Iodometric estimation of copper in copper pyrite ore.
5. Volumetric estimation of total acid number (TAN) of given oil.
6. Volumetric estimation of
   a. Total hardness of given water sample using standard EDTA solution.
   b. Alkalinity of given water sample using 0.01N sulphuric acid.
7. Proximate analysis of coal
   a. Gravimetric estimation moisture in given coal sample.
   b. Gravimetric estimation ash in given coal sample

Instrumental analysis

8. Determine the conductivity of given water sample.
9. Determination of the Iron content in given cement sample using colorimeter.
10. Determination of viscosity of lubricating oil using Redwood viscometer.
11. Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
12. To verify the first law of electrolysis of copper sulfate using copper electrode.
13. Construction and measurement of emf of electrochemical cell (Daniel cell).
14. To study the effect of dissimilar metal combination on cell emf.
15. To apply thin layer chromatography for separation of mixture of inorganic/organic compounds.
16. Qualitative detection of ARSENIC in a given sample of water (~5 ppm solution of sodium arsenite)
17. Determination of dissolved oxygen in a sample of water.
18. Determination of pH value of unknown solution.

Reference book
VOGELS INORGANIC QUANTITATIVE ANALYSIS.

Members present in Syllabus Committee:
1. **Dr. Ujjval Kumar Bhattacharyya** (convener, lecturer, North Calcutta Polytechnic).
2. **Dr. Gandhi Kumar Kar** (Professor and head of the Dept. of Chemistry, Presidency University, Kolkata)
3. **Dr. Shyamal Kumar Chattopadhyay** (Professor IIEST, Shibpur).
4. **Dr. Mrinal Kanti Bain**, lecturer, Calcutta Technical School.
5. **Dr. Dipankar Maity**, lecturer, Birla Institute of Technology.
6. **Dr. Ranjal Paul**, Sr. Manager, Sun Pharmaceuticals Baroda.
7. **Prolay Roy,** lecturer, Memari Government Polytechnic.

Syllabus of Communication Skills in English

{The syllabus for the subject has been prepared by the Syllabus Sub-committee for the subject "Communication Skills in English" in accordance with the following instructions / directions received from Mr. B. Samanta (WBSCTVESD) vide his mail dated Dec. 6, 2019 at 12.04 PM}:-

"A meeting was held on 31.10.2019 at the Council. In the meeting following decisions were taken by the Council
1.   It was decided unanimously to adopt the curriculum structure of the AICTE model syllabus 2019(attached) for all diploma courses of WBSCTVESD.
2.   New curriculum structure and syllabus of diploma courses shall be prepared as per AICTE model Syllabus 2019 and implemented from the next academic session i.e. 2020-21 in phase manner.
3.   Content of the syllabus of diploma courses shall be customized as per the requirement and as per the advice of the syllabus sub- committee."

Sl. No.	Code No.	Course Title	Hours per week (Total-4)			Semester	Credits
			Lecture	Tutorial	Practical		
1	HS 101	Communication Skills in English	2	0	0	1	2
2	HS105	Communication Skills in English - Lab	0	0	2	1	1
Total number of weeks – 17 (seventeen)							

Preamble:

Engineering is a service, and therefore it exists to meet human needs. Needs are communicated through language. No engineer, no matter how brilliant, can do a good job if she or he does not know what the job is for, who they are serving, for what purpose, and what needs to be done to render this service. Feedback also has to be communicated in language: figures are not enough without explanation. Communication, spoken or written, is thus essential for any service provider to do their job.

    However, in most cases the courses and syllabi offered to STEM undergraduates do not adequately address the need to make them good communicators. It is often assumed that this question has been addressed by schooling, or they attempt to adapt liberal arts courses to the needs of STEM workers, thereby failing to address those needs. In a country such as India where language learning in general and English learning in particular tend to be neglected or mis-taught, this problem is compounded. To be successful, communicative language learning has to be a two way process, with communication between the teacher and student, and between students. However, the culture of student passivity in the classroom which prevails in India is poor soil for these skills to take root.

We have therefore attempted in this course to produce a system that allows, (within the known constraints) even in a limited form, for project work and conversations, collaboration and role-play, to mitigate the 'keep quiet' culture of the Indian classroom and to encourage young people to find their voices. Polytechnic, College and university students are just one small step away from becoming young professionals, and once they take that step their livelihoods (and also the safety and happiness of their clients) will depend upon how well they can ask and answer questions in the real world.

Without adequate practice, confidence-building and positive reinforcement, the practice of teaching them the pedantic small points of the rules of English grammar, or obsessing over their pronunciation, only serves to silence them further. What they need is an environment where they can communicate with each other and then troubleshoot the results, go over bad communication and make it better, identify their mistakes and correct them without being terrorised by cultural stereotypes. Graduate education should be a safe space for them to do this before work in the real world attaches real penalties to the results of bad communication. With this syllabus and attached guidelines, we have tried to take a small step in the right direction.

Course Title: **Communication Skills in English**

Course Code No.: **HS101**

Hours per week: **02 (Lecture), Total contact hours / week: 02**

Credits: **02**

Course Objectives (AICTE): Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus the main objectives of this course are:

- To develop confidence in speaking English with correct pronunciation
- To develop communication skills of the students i.e. listening, speaking, reading and writing skills
- To introduce the need for personality development – Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc.

Course Content (Theory)
Unit – 1 Communiucation: Theory and Practice

- Basics of communication: Introduction, meaning and definition, process of communication etc.
- Types of communication: formal and informal, verbal, non-verbal and written. Barriers to effective communication
- 7 Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).
- Art of Effective communication,

- o Choosing words
- o Voice
- o Modulation
- o Clarity
- o Time
- o Simplification of words

- Technical Communication

Unit – 2 Soft Skills for Professional Excellence

- Introduction: Soft Skills and Hard Skills.
- Importance of Soft Skills.
- Life skills: Self-awareness and Self-analysis, adaptability, social skills, emotional intelligence, Interpersonal relationship and empathy etc.
- Applying soft skills across cultures – Corporate work culture, Work persona, Professionalism, Time Management
- Case Studies

Unit – 3: Reading Comprehension

Note Taking, Comprehension, vocabulary enhancement and grammar exercises based on reading of texts.

Unit – 4: Professional Writing

The art of writing Report and Memo
CVs
Letters: Job Application and Business
Drafting e-mail, minutes of a meeting, etc

Unit – 5: Vocabulary and Grammar

Remedial Grammar and Exercises
Professional Workplace Communication
Parts of speech, active and passive voice, tenses etc.

Course outcomes (AICTE):
At the end of this course, the participants will:

- Develop basic speaking and writing skills including proper usage of language and vocabulary so that they can become highly confident and skilled speakers and writers.
- Be informed of the latest trends in basic verbal activities such as presentations, facing interviews and other forms of oral communication.
- Also develop skills of group presentation and communication in team.
- Develop non-verbal communication such as proper use of body language and gestures

Course Title: Communication Skills in English - Lab

Course Code No.: HS105

Hours per week: 02 (Practical), Total contact hours / week: 02

Credits: 01

Course Objectives (AICTE):

Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus the main objectives of this course are:

1. To develop listening skills for enhancing communication.
2. To develop speaking skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality development – Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills, etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content:

Unit – 1:
Basic Common Communication Problems and their Solutions

Unit – 2:
Introduction to Phonetics
Sounds: consonant, vowel. Transcription of words (IPA), weak forms etc.

Unit – 3:
Speaking and Listening Skills
Standard and Formal Speech: Oral presentations, Group Discussions, Public Speaking, Business presentations etc. Conversation practice and role playing, Job interviews, Note taking etc.

Unit – 4:
Non-verbal Communication
Proxemics, Haptics and Kinesics

Members of the Syllabus Sub-committee for *Communication Skills in English:-*

1. Prof. Rimi B. Chatterjee (Expert),
   Professor, Department of English, Jadavpur University and former Professor of English at IIT, Kharagpur, West Bengal.
   (Prof. Chatterjee, the subject expert, has wide ranging experience in teaching Communication Skills in English to Engineering students, both in IIT, Kanpur and Jadavpur University).
2. Ms. Purna Biswas (Member), Lecturer in Humanities, EIJE, Dalalpukur, Howrah
3. Mr. Santanu Mitra (Member), Lecturer in Humanities, Women's Polytechnic, Kolkata
4. Mr. Hemadri Chatterjee (Convener), Lecturer in Humanities, Ramakrishna Mission Shilpapitha, Belgharia, Kolkata

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Proposed Syllabus for Engineering Graphics

Name of the Course :	Engineering Graphics	
Course Code :	Semester : First	
Duration : 17 Weeks	Maximum Marks :	: 100
Lecture : Nil	Assignment	: 20
	Class Performance	: 20
Tutorial : Nil	Viva Voce	: 10
	Attendance	: 10
Practical : 3 hrs./week	External (Viva, Sketch Book & Drawing Sheet)	: 40
Credit : 1.5		

Aim :
1. The Course is aimed to develop the basic graphic skills so that the students can prepare Engineering Drawing in their practical field.
2. Understand the fundamentals of Engineering Graphics.
3. Read and interpret object drawing.
4. To develop the skills of Computer Aided Drafting and can easily cope up the skill of drafting for modern drawing offices/industries.

Objectives :
1. To develop sense of Scale and drawing technique of different curves and their application.
2. To develop drafting and sketching skills, to know the applications of drawing equipment and get familiarize with Indian Standards related to engineering drawing.
3. To develop concept of Orthographic Projection and to draw Orthographic Views for different objects.
4. To visualize three dimensional objects from Orthographic Views and to draw isometric views/projections.
5. To be familiar with AutoCAD and to develop the skill of drafting in AutoCAD by using different commands.

Pre-requisites :
1. Unambiguous and clear visualization.
2. Sound Pictorial Intelligence.

Unit No.	Contents	
Unit 1	1.1 Letters and numerals (Single Stroke Vertical) 1.2 Conventions of lines and their applications 1.3 Concept of Representative Fraction (R.F), Reduced scale, Enlarged scale & Full Scale, Engineering Scale such as Plain Scale & Diagonal Scale. 1.4 Dimensional Techniques - Unidirectional System and Aligned System.	

Unit 2	2.1 Geometrical Construction :
	     a)Draw Regular Polygons, Ellipse, Parabola, hyperbola
	     b) Draw Curve passing through given no. of points, cycloid, involute of a circle and polygon	

Unit 3	3.1 Introduction to Orthographic Projection : Concept of First Angle & Third Angle of projection. Projections of lines(limited to both ends in 1st quadrant) : parallel to the reference planes, inclined to the reference planes (1st Angle Method) 3.2 Projections of solid body: Regular Polygonal Pyramid, Cylinder, Cone - inclined to only one reference plane (1st Angle Method)	

Unit 4	4.1 Conversion of Pictorial Views into orthographic views (Simple Objects &First Angle Projection Method Only)
Unit 5	5.1 Introduction to Isometric Projections, Concept of Isometric Scale and Isometric Views 5.2 Conversion of Orthographic views into Isometric Views/Projections : Simple Objects e.g. regular prism, pyramid, cone, cylinder.
Unit 6	6.1 Free hand sketches of engineering elements such as thread profile, nuts, bolts, studs, set screws, washers, locking arrangements etc. and their conventional representation (For branches other than Mechanical Engineering, the teachers should select branch specific elements for free hand sketching)

Unit 7	7.1 Introduction to different commands and toolbars of AutoCAD
	  a) Draw command : Lines, Circle, Polygon, Arc, Ellipse, Polyline, Fillet, Chamfer, Hatch, Array (Rectangular & Polar) etc.
	  b) Modify Command : Offset, Trim, Extend, Erase, Fillet, Chamfer, Break, Lengthen, Copy, Move, Mirror, Stretch, Match Properties, Pedit etc.
	  c) View : Zoom All, Zoom Window, Zoom Extent etc.
	  d) Dimensioning : Dimension Setting, Linear, Aligned, Radial, Diameter, Leader, Angular etc.
	  c) Text : Text Style, Dtext, Mtext, DDedit etc.
	  d) Format : Limits, Layers, Pan etc.
	7.2 Making a few simple 2D drawings in AutoCAD.

Sl. No.	Practical Exercise	Unit No.	Hrs.
1	Draw horizontal, vertical, 30˚, 45˚, 60˚, 75˚, different types of lines, dimensioning styles using Tee and Set Squares / Drafters. (Do this exercise in Sketch Book)	1	02
2	Write single stroke vertical alphabets and numerical (7:4 ratio) (Do this exercise in Sketch Book)	1	02
3	Draw regular geometric constructions and redraw/copy the given figure (Do this exercise in Sketch Book)	1	02
4	Draw at least two problems on plain scale and two problems on diagonal scales (Do this exercise in Sketch Book)	1	03
5	Draw problems on ellipse, parabola, involute and cycloid (Do this exercise in Sketch Book)	2	06
6	Draw at least two problems on lines and two problems on solid (First Angle Projection method) (Do this exercise in A2 size drawing sheet)	3	09
7	Plan, Elevation and Side View of at least two pictorial views to be drawn on one A2 size Drawing Sheet along with dimensions	4	06
8	At least Two Isometric Views and two Isometric Projections to be drawn on one A2 size Drawing Sheet	5	06

9	Draw free hand sketches / conventional representation of machine elements such as thread profile, nuts, bolts, studs, set screws, washers, locking arrangements etc.	6	03
10	Simple geometrical figures such as triangle, rectangle, polygon, circle, ellipse, and simple orthographic views of brackets, gaskets etc. to be drawn in AutoCAD and Printout to be taken on A4 size Sheet. At least two sheets to be prepared.	7	12
	Total Period		51

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
N.D.Bhatt	Engineering Drawing	53rd Edition	Charotkar Publishing House
R.K.Dhawan	Engineering Drawing	Revised Edition 2015	S.Chand & Co.
K. Venugopal & V. Prabhuraja Raja	Engineering Drawing and Graphics + AutoCAD		New Age Publication

Reference Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
S.N. Lal	Engineering Drawing		CENGAGE
Basant Agrawal & C M Agrwal	Engineering Drawing		Tata McGrew Hill
Dhananjay A Jolhe	Engineering Drawing with an Introduction to AutoCAD		Tata McGrew Hill
S.P.Dey	AutoCAD 2014		Vikas Publisher
P.S. Gill	Engineering Drawing		S.K.Kataria & Sons.

References :

1.Engineering Graphics Syllabus of AICTE Model Curriculum 2019.

2. Syllabus of Technical Drawing (Old) of W.B.S.C.T.E

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to sites such as Railway station and research establishment around the institution.

Learning Outcomes:

At the end of the course student will be able to

- To express quantitative measurements accurately.
- To practice and adapt good measuring techniques.
- To use various apparatus for precise measurements.
- To understand and differentiate different methods of quantitative analysis.
- To know and understand principles of quantitative analysis using instruments.
- To construct different electrochemical cells used in developing batteries.
- To understand and appreciate methods of corrosion abetments.

Reference Books:

1. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
4. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.

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Course Code	:	HS103
Course Title	:	Sports and Yoga
Number of Credits	:	1(L:0,T:0,P:2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:
- To make the students understand the importance of sound health and fitness principles as they relate to better health.

- To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.

- To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.

- To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Course Content:

- **Introduction to Physical Education**

  o Meaning & definition of Physical Education

  o Aims & Objectives of Physical Education

  o Changing trends in Physical Education

- **Olympic Movement**

  o Ancient & Modern Olympics (Summer & Winter)

  o Olympic Symbols, Ideals, Objectives & Values

  o Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayanchand Award, Rajiv Gandhi Khel Ratna Award etc.)

- **Physical Fitness, Wellness & Lifestyle**

  o Meaning & Importance of Physical Fitness & Wellness

  o Components of Physical fitness

  o Components of Health related fitness

  o Components of wellness

  o Preventing Health Threats through Lifestyle Change

  o Concept of Positive Lifestyle

- **Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**

  o Define Anatomy, Physiology & Its Importance

  o Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)

- **Kinesiology, Biomechanics & Sports**

  o Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports

  o Newton's Law of Motion & its application in sports.

  o Friction and its effects in Sports.

- **Postures**

  o Meaning and Concept of Postures.

  o Causes of Bad Posture.

  o Advantages & disadvantages of weight training.

  o Concept & advantages of Correct Posture.

  o Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis.

  o Corrective Measures for Postural Deformities

- **Yoga**

  o Meaning & Importance of Yoga

  o Elements of Yoga

  o Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas

  o Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Sha-shankasana)

  o Relaxation Techniques for improving concentration - Yog-nidra

- **Yoga & Lifestyle**

  o Asanas as preventive measures.

  o Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana.

  o Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.

  o Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.

  o Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana.

  o Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

- **Training and Planning in Sports**

  o Meaning of Training

  o Warming up and limbering down

  o Skill, Technique & Style

  o Meaning and Objectives of Planning.

  o Tournament – Knock-Out, League/Round Robin & Combination.

- **Psychology & Sports**

  o Definition & Importance of Psychology in Physical Edu. & Sports

  o Define & Differentiate Between Growth & Development

  o Adolescent Problems & Their Management

  o Emotion: Concept, Type & Controlling of emotions

  o Meaning, Concept & Types of Aggressions in Sports.

  o Psychological benefits of exercise.

  o Anxiety & Fear and its effects on Sports Performance.

  o Motivation, its type & techniques.

  o Understanding Stress & Coping Strategies.

- **Doping**
  - Meaning and Concept of Doping
  - Prohibited Substances & Methods
  - Side Effects of Prohibited Substances

- **Sports Medicine**
  - First Aid – Definition, Aims & Objectives.
  - Sports injuries: Classification, Causes & Prevention.
  - Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries

- **Sports / Games**

  Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.

  - History of the Game/Sport.
  - Latest General Rules of the Game/Sport.
  - Specifications of Play Fields and Related Sports Equipment.
  - Important Tournaments and Venues.
  - Sports Personalities.
  - Proper Sports Gear and its Importance.

References:
1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

Course Outcomes:

On successful completion of the course the students will be able to:
(i) Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
(ii) Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
(iii) Learn breathing exercises and healthy fitness activities
(iv) Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.
(v) Perform yoga movements in various combination and forms.
(vi) Assess current personal fitness levels.
(vii) Identify opportunities for participation in yoga and sports activities.
(viii) Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
(ix) Improve personal fitness through participation in sports and yogic activities.
(x) Develop understanding of psychological problems associated with the age and lifestyle.

(xi)   Demonstrate an understanding of sound nutritional practices as related to health and physical performance.

(xii)   Assess yoga activities in terms of fitness value.

(xiii) Identify and apply injury prevention principles related to yoga and physical fitness activities.

(xiv)   Understand and correctly apply biomechanical and physiological principles elated to exercise and training.

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Course Code	:	HS105
Course Title	:	Communication Skills in English - Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:
Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:

1. To develop listening skills for enhancing communication.

2. To develop speaking skills with a focus on correct pronunciation and fluency.

3. To introduce the need for Personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content:
Unit 1 Listening Skills
Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

Unit II Introduction to Phonetics
Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.

Unit III Speaking Skills
Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.

Unit IV Building vocabulary
Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to enhance self-expression and vocabulary of participants.

Recommended Readings:
1. Daniel Jones. *The Pronunciation of English.* Cambridge: Cambridge University Press, 1956.

2. James Hartman& et al. Ed. *English Pronouncing Dictionary.* Cambridge: Cambridge University

Syllabus for Multimedia Workshop Practice

Name of the Course : MUTIMEDIA TECHNOLOGY, Name of the Subject: **Multimedia Workshop Practice**	
Course Code:	Semester: First
Duration: 15 weeks	Maximum Marks:
Teaching Scheme	Examination Scheme
Theory & Tutorial: NIL	Attendance & Teacher Assessment: 50% of Maximum marks
Pre-requisite Knowledge: Expected	End semester examination: 50% of Maximum marks
Practical: 3hrs./week	Credit: 1.5
Aim:	
	To acquaint students with basic skills in drawing with the help of Graphic designing tools.
	To make ready the students for modern office practice.
Outcome:	
	Identify different tools to design basic Graphic Arts .
	Create Graphic Arts for layout design.
	Categorize different components of multimedia .
	Create slide-based presentation combing different components of multimedia.
Pre-Requisite -	
	Knowledge of basic Computer hardware & software is expected.

Content Details		Hours/Unit
Unit 1	**Started with MS Paint**	
	• Navigating the MS Paint Interface • Drawing with Pencil & Brush Tool, Painting using Mixing of Colors	6
Unit 2	**Getting Started with Microsoft PowerPoint**	
	• Navigating the PowerPoint Interface • View & Navigating a PowerPoint Presentation • Saving a PowerPoint Presentation • Adding Text to the PowerPoint Slides, Working with PowerPoint Slide Layouts	6
Unit 3	**Formatting Power point Slide Background**	
	• Adding Color to a Slides Background • Working with PowerPoint Gradients • Adding an Image to a Slide Background • Apply Background to all Slides.	6
Unit 4	**Adding Graphical Elements within a PowerPoint Presentation**	
	• Adding images with PowerPoint Content Slide Layout • Formatting Images within Power point	6

	• Adding Images to a Power point Slide • Adding & Formatting Shape with a Power point Slide	
Unit 5	**Working with Charts within Power point & Deliver your Presentation**	
	• Create a Power point Chart • Adding Data to a PowerPoint Chart • Formatting a Chart within PowerPoint • Changing a Chart Title • Spell Check the PowerPoint Presentation • Apply Transitions to PowerPoint Slides • PowerPoint Slide Durations/Timing, • Deliver a Presentation with Presenter View.	8
Unit 6	**CorelDraw Introduction**	
	• Introduction to Workspace, Multiple Documents and Pages • with Pick Tool, Freehand and Free Transform, Shape Tools, Crop Tools, Zoom and Pan Tools, Freehand Tools, Artistic Media Tools,	7
Unit 7	**Shaping, Transformation ,Tracing, Attributes & Effects**	
	• Pick Tool & Transformations, Shape Tool • Shaping, How To Add & Edit Text in Corel Draw, • Converting Text to Shape • To Convert A Picture Into A Vector Image,	6

Suggested Books:
1. Corel draw 2020 - Training Book with many Exercises
. 2. Corel Draw Training Guide, Satish Jain
3 PowerPoint Step By Step , 2019
4. Microsoft Office 365 & Office 2019 Introductory

n and Skill

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Committee for Model Curriculum of Diploma Course in Architecture

MRS.MUNMUN CHAKRAVARTY, Lecturer in Dept. of Architecture, North Calcutta Polytechnic, Govt. of West Bengal, Kolkata-700002	CONVENER
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AR. SAIBAL KAR, KERR& ASSOCIATE, 10651A,S.N. Banerjee Road, 2nd floor, Kolkata-700014	EXPERT
DR SANJIB NAG, Professor & former Head, Department of Architecture, Jadavpur University, Kolkata	EXPERT
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MR SAIBAL THAKURATA, Chief Town Planner, Town & country Planning Branch, Urban Development & Municipal Affair Department, Govt. of West Bengal, "NAGARAYAN" DF-8, Sector-I, Bidhannagar, Kolkata-700064	EXPERT
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MR. JAVED AKRAM, Lecturer in Dept. of Architecture, S.N. Bose Govt. Polytechnic, Ratua, malda, West Bengal.	MEMBER
MR. ANIRUDDHA MUTSUDDI, Lecturer in Dept. of Architecture, Govt.Polytechnic, Siliguri, West Bengal.	MEMBER
MS. ANKITA BAKSI, Lecturer in Dept. of Architecture, Women's Polytechnic, Kolkata, Govt. of West Bengal.	MEMBER

FIRST YEAR CURRICULUM STRUCTURE

(ARCHITECTURE)

Sl. No	Category of course	Code No	Course Title	L	T	P	Total Contact hrs/week	Credits
1	Basic Science	BS101	Mathematics-I	2	1	0	3	3
2	Basic Science	BS103	Applied Physics-I	2	1	0	3	3
3	Basic Science	BS105	Applied Chemistry	2	1	0	3	3
4	Humanities & Social Science	HS101	Communication Skills in English	2	0	0	2	2
5	Engineering Science	ES101	Architectural Drawing-I	0	0	3	3	1.5
6	Engineering Science	ES103	Architectural Workshop Practice	0	0	3	3	1.5
7	Basic Science	BS107	Applied Physics-I Lab	0	0	2	2	1
8	Basic Science	BS109	Applied Chemistry Lab	0	0	2	2	1
9	Humanities & Social Science	HS103	Sports and Yoga	0	0	2	2	1
10	Humanities & Social Science	HS105	Communication Skills in English Lab	0	0	2	2	1
			Total					18

SEMESTER -I

Course Code	:	BS101
Course Title	:	Mathematics
Number of Credits	:	3 (L:2,T:1,P:0)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:

This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus and Basic elements of algebra.

The detail course content is *same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

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Course Code	:	BS103
Course Title	:	Applied Physics –I
Number of Credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Physics
Course Category	:	BS

Course Objectives:
Applied Physics includes the study of a large number of diverse topics all related to materials/things that exist 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 such objects behave. Concrete use of physical principles and analysis in various fields of engineering and technology are given prominence in the course content. The course will help the diploma engineers to apply the basic concepts and principles to solve broad based engineering problems and to understand different technology based applications.

Teaching Approach: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

The detail course content: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Course Code	:	BS105
Course Title	:	Applied Chemistry
Number of Credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	High School Level Physics
Course Category	:	BS

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Course Objectives:
There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. On successful completion of this course content will enable technicians to understand, ascertain and analyse and properties of natural raw materials require for producing economical and eco-friendly finished products.

❖ Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.

❖ Use relevant water treatment method to solve domestic and industrial problems.

❖ Solve the engineering problems using knowledge of engineering materials and properties.

❖ Use relevant fuel and lubricants for domestic and industrial applications

❖ Solve the engineering problems using concept of Electrochemistry and corrosion.

The detail course content is *same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

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Course Code	:	HS101
Course Title	:	Communication Skills in English
Number of Credits	:	2 (L: 2, T: 0, P: 0)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:
Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students.
Thus, the main objectives of this course are:

❖ To develop confidence in speaking English with correct pronunciation.
❖ To develop communication skills of the students i.e. listening, speaking, reading and writing skills.
❖ To introduce the need for personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc.

The detail course content is *same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

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Course Code	:	ES101
Course Title	:	Architectural Drawing-I
Number of Credits	:	1.5 (L: 0, T: 0, P: 3)
Prerequisites	:	NIL
Course Category	:	ES

Course Objectives:
- ❖ To understand the language of Architectural Drawing which is used to express ideas, convey instructions while carrying out professional jobs.
- ❖ To develop drafting and sketching skills, to know the applications of drawing equipments, and get familiarize with Indian Standards related to Architectural drawings.
- ❖ To develop skills to visualize actual object or a part of it, on the basis of drawings.
- ❖ To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.

Course Content:-

Unit – I: (Basic elements of Drawing)

Drawing Instruments and supporting materials: Method to use them with applications. Convention of lines and their applications.
Lettering: Practice in lettering, lettering used in architectural drawings including different fonts.
Representative Fractions – Reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale.
Dimensioning techniques as per SP-46:2003 – Types and applications of chain, parallel and co-ordinate dimensioning. Geometrical constructions.

Unit – II :-(Introduction to curves)

To draw an ellipse by (a) Directrix and focus method (c) Concentric circles method
To draw a parabola by (a) Directrix and focus method (b) Rectangle method
To draw a hyperbola by (a) Directrix and focus method (b) Passing through given points with reference to asymptotes

Unit – III (Orthographic projections)

Introduction of projections-Orthographic, perspective, isometric, axonometric and oblique: concept and applications. (No question to be asked in examination).

Introduction to orthographic projection- First angle and Third angle method, their symbols. Orthographic projection of points, lines, planes, solids. (Use First Angle Projection method only)

Unit – IV (Isometric Projections)

Introduction to isometric projections- Isometric scale and Natural scale. Isometric view and isometric projection. Illustrative problems related to objects containing lines, circles and arcs shape only. Conversion of orthographic views into isometric view/projection.

Sl No	Practical Exercises	Unit No	Hours	No of sheets
1	1.1 To draw horizontal, Vertical, 30 degree, 45 degree, 60 and 75 degrees lines using Tee and Set squares, studying different types of lines and their applications, understanding dimensioning styles. (Solve in exercise books).	I	3hrs	
2	1.2 To write alphabets and numerical in architectural style.(Solve in exercise books).	I	3 hrs	ONE

3	1.3 To draw regular geometric constructions using various scale (reducing scale, full scale, enlarging scale). Understanding plain scale and diagonal scale..	I	6 hrs	
4	2.1 To draw an ellipse by (a) Directrix and focus method (b) Concentric circles method.	II	3hrs.	ONE
5	2.2 To draw a parabola by (a) Directrix and focus method (b) Rectangle method.	II	3 hrs	
6	2.3 To draw a hyperbola by (a) Directrix and focus method (b) Passing through given points with reference to asymptotes.	II	3 hrs	
7	3.1 Introduction to orthographic projections and problems on orthographic projections of points.	III	3hrs	TWO
8	3.2 Problems on orthographic projections (using first angle method of projection) of Lines inclined to one reference plane only and limited to both ends in one quadrant.	III	3 hrs	
9	3.3 Problems on orthographic projections (using first angle method of projection) of simple planes of circle, square, rectangle, rhombus, pentagon and hexagon, surface inclined to one reference plane and perpendicular to the other.	III	3 hrs	
10	3.4 Problems on orthographic projection (using first angle method of projection) of simple solids of cube, prism, pyramid, cylinder, cone, and axis inclined to one reference plane and perpendicular to the other.	III	6 hrs	
11	4.1Introduction to Isometric projection and to draw two problems on Isometric view of simple objects using natural scale.	IV	6 hrs	ONE
12	4.2 To draw two problems on Isometric projection of simple objects using isometric scale.	IV	3 hrs	

SUGGESTED LEARNING RESOURCES
1. Bureau of Indian Standards. *Engineering Drawing Practice for Schools and Colleges*

IS: Sp-46. BIS. Government of India, Third Reprint, October 1998; ISBN: 81-7061-091-2.

2. Bhatt, N. D. *Engineering Drawing*. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93- 80358-17-8.

3. Jain & Gautam, Engineering Graphics & Design, Khanna Publishing House, New Delhi (ISBN: 978- 93-86173-478)

4. Jolhe, D. A. *Engineering Drawing*. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07- 064837-1

5. Dhawan, R. K. *Engineering Drawing*. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0.

6. Shah, P. J. *Engineering Drawing*. S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.

Course Outcomes

Following outcomes will be achieved:

1) Select and construct appropriate drawing scales, use drawing equipment's, and understand Indian Standards of engineering drawing.

2) Draw views of given object and components.

3) Sketch orthographic projections into isometric projections and vice versa.

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Course Code	:	ES103
Course Title	:	Architectural Workshop practice
Number of Credits	:	1.5 (L: 0, T: 0, P: 3)
Prerequisites	:	NIL
Course Category	:	ES

Course Objectives:

❖ To understand, identify, select and use various marking, measuring, and holding, striking and cutting tools and equipment's

❖ To understand and interpret job drawings, produce jobs, and inspect the job for specified dimensions.

❖ To understand the various types of wiring systems and acquire skills in house wiring.

❖ To understand, operate, and control different machines and equipment's adopting safety practices.

❖ To understand how to prepare mortar and use it in construction of different types of brick bonding and pointing. Students will have knowledge on different type tools used by carpenter and masons.

Course Content:

Sl.No	Details Of Practical Content
1	**Carpentry:** i) Demonstration of different wood working tools / machines. ii) Demonstration of different wood working processes, like plaining, marking, chiselling, grooving, turning of wood etc. iii) One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.
2	**Electrical House Wiring:** Practice on simple lamp circuits (i) one lamp controlled by one switch by surface conduit wiring, (ii) Lamp circuits- connection of lamp and socket by separate switches, (iii) Connection of Fluorescent lamp/tube light, (iv) simple lamp circuits-install bedroom lighting. And (v) Simple lamp circuits- install stair case wiring.
3	**Masonry:** (general shop task) **(i)Exercise on handling of bricks, cement, sand and aggregate** a. Handling of brick- Identification of traditional brick and modular brick. Classification of brick (first class, second class, third class) and know how to handle it. b. Handling of cement- Identification of different types of cement(Portland cement and Special cement) c. Handling of sand and aggregates- Identification of fine sand and coarse sand. Identification of fine aggregates and coarse aggregates **(ii) Knowledge of various tools used by mason -**Purpose, specification, uses, care & maintenance of various tools and equipments used in masonry construction by segregating as cutting tools, measuring tools, supporting tools, holding tools etc. and knowledge on safety precautions in masonry construction. **(iii) Exercise on preparation of mortar** Preparation of Mortar- preparation of cement mortar with appropriate proportion of cement, sand and water. **(iv) Exercise on laying of bricks in various bonds**- Practice on different types of brick bonding for different thickness of wall (English bond, Flemish bond), Brick bond in T-Junction of wall. **(v) Exercise on pointing and finishing**-Practice on cement mortar plaster finish on brick wall and different types of pointing on exposed brick work. **Note:- The carpentry and Electrical house wiring workshop will be conducted in the existing workshop set up of the respective college. In case of Masonry workshop if the respective college is having department of Civil Engineering, their resources like (lab equipments, materials and lab assistant) can be utilised along with a faculty of department of Architecture. In case the civil engineering department is not there in the respective college, the department of Architecture will have to procure equipments, materials and skilled manpower (mason and labour) for the required number of classes for smooth functioning of the workshop.**

References:
1. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
2. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
3. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
4. Fundamentals of Building Construction by Allen Edward
5. Sushil Kumar, Building Construction, Standard Publishers Distributers, Delhi-110006

Course outcomes
At the end of the course, the student will be able to:

CO1	Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipments.
CO2	Understand job drawing and complete jobs as per specifications in allotted time.
CO3	Inspect the job for the desired dimensions and shape.
CO4	Acquire skill on construction of brick masonry, mortar finish and pointing.

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Course Code	:	BS107
Course Title	:	Applied Physics-I Labs
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives
Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

List of Practical's/Activities (To perform minimum 10 practicals).

The detail course content is *same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Learning Outcome: *same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

SUGGESTED STUDENT ACTIVITES & STRATEGIES: *same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

References: *same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

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Course Code	:	BS109
Course Title	:	Applied Chemistry Labs
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	BS

Course Objectives:
There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

LIST OF PRACTICALS: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Instrumental analysis: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Teachers should use the following strategies to achieve the various outcomes of the course: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Learning Outcomes: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Reference Books: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

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Course Code	:	HS103
Course Title	:	Sports and Yoga
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives:
- ❖ To make the students understand the importance of sound health and fitness principles as they relate to better health.
- ❖ To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
- ❖ To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
- ❖ To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Course Content: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

References: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Course Outcomes: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

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Course Code	:	HS105
Course Title	:	Communication Skills in English - Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	HS

Course Objectives: Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:
1. To develop listening skills for enhancing communication.
2. To develop speaking skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges,

leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Course Content: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Recommended Readings: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

Learning Outcome: *Same as of all other engineering programme of Diploma Courses in Engineering and Technology.*

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Sl.No	Category of Courses	Code No	Course Title	Credits	Marks
— **Semester I (Architecture)**					
1	Basic Science	BS101	Mathematics-I	3	100
2	Basic Science	BS103	Applied Physics-I	3	100
3	Basic Science	BS105	Applied Chemistry	3	100
4	Humanities & Social Science	HS101	Communication Skills in English	2	100
5	Engineering Science	ES101	Architectural Drawing-I	1.5	100
6	Engineering Science	ES103	Architectural Workshop Practice	1.5	100
7	Basic Science	BS107	Applied Physics-I Lab	1	100
8	Basic Science	BS109	Applied Chemistry Lab	1	100
9	Humanities & Social Science	HS103	Sports and Yoga	1	100
10	Humanities & Social Science	HS105	Communication Skills in English Lab	1	100
Total				**18**	**1000**