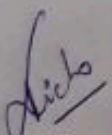# GOVT. POLYTECHNIC KANGRA, DISTT KANGRA(H.P).
## DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES

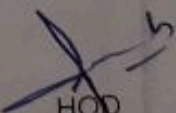**Course: Diploma**                                              **Subject; EC&S-I**

### Lesson Plan for syllabus Coverage: Theory-42 Hours, Practical-28 Hours.

| S. No | Lecture No. | Topic | Syllabus Detail | Remarks |
|---|---|---|---|---|
| 1 | 1-10 | Communication: Theory & Practices | 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. 7Cs for effective communication. Art of Effective communication, Choosing words, Voice, Modulation, Clarity, Time, Simplification of words Technical Communication | |
| 2 | 11-16 | Soft Skills for Professional Excellence | Introduction: Soft Skills and Hard Skills. Importance of soft skills. Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc. Applying soft skills across cultures. | |
| 3 | 17-27 | Reading Comprehension | Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts: Section-1 Short Stories 1. "The Gift of the Magi" by O. Henry. 2. "Uncle Podger Hangs a Picture" Jerome K. Jerome. Section-2 Poetry 1. "Night of the Scorpion" by Nissim Ezekiel. 2. "Stopping by Woods on a Snowy Evening" by Robert Frost. 3. "Where the Mind is Without Fear" by Rabindranath Tagore. | |
| 4 | 28-34 | Professional Writing | 1. The art of précis writing. 2. Letters: business and personal. 3. Drafting e-mail, notices, minutes of a meeting etc. | |
| 5 | 35-42 | Vocabulary and Grammar | 1. Glossary of administrative terms (English and Hindi). 2. One-word substitution, Idioms and phrases etc. Parts of speech, active and passive voice, tenses etc., Punctuation | |

(Richa Sharma)
Lecturer English

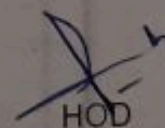HOD
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**Course: Diploma**                                    **Subject: Mathematics -I**

### Lesson Plan for syllabus Coverage: Theory-70 hours.

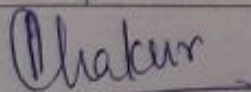| S. No | Lecture No. | Topic | Syllabus Detail | Remarks |
|---|---|---|---|---|
| 1 | 1-10 | Trignometry | Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). | |
| 2 | 11-20 | Trignometry | Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cosx . | |
| 3 | 21-30 | Differential Calculus | Definition of function; Concept of limits. Four standard limits $\lim_{x \to a} \frac{x^n - a^n}{x-a}$ , $\lim_{x \to 0} \frac{\sin x}{x}$ , $\lim_{x \to 0} \frac{a^x - 1}{x}$ $\lim_{x \to 0} (1+x)^{\frac{1}{x}}$ & Differentiation by definition of $x^n$, $\sin x$, $\cos x$, $\tan x$ and $e^x$. Differentiation of sum, product and quotient of functions. | |
| 4 | 31-40 | Differential Calculus | Differentiation of function of a function. Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation. | |
| 5 | 41-50 | Algebra | **Complex Numbers:** Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number. De-movier's theorem, its application | |
| 6 | 51-60 | Algebra | **Partial fractions:** Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors. **Permutations and Combinations:** Value of $^nP_r$ and $^nC_r$. | |
| 7 | 61-70 | Algebra | **Binomial theorem:** Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems | |

(Nisha Kumari)
Lecturer Mathematics

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# GOVT. POLYTECHNIC KANGRA, DISTT KANGRA (H.P).
## DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES

**Subject: Applied Physics-I**

**Course: Diploma**

### Lesson Plan for syllabus Coverage: Theory-56 Hours, Practical-28 Hours.

| S. No | Lecture No. | Topic | Syllabus Detail | Remarks |
|---|---|---|---|---|
| 1 | 1-8 | Physical world, Units and Measurements | Physical quantities: Fundamental & Derived, Units and system of units, Dimensions & Dimensional formulae of physical quantities. Principle of homogeneity of dimensions, Dimensional equations and their applications, Limitations of dimensional analysis. Errors in measurements, Absolute error, Relative error, error estimation and significant figures. | |
| 2 | 9-19 | Force and Motion | Scalar and Vector quantities-examples, representation of vectors. Addition & subtraction of Vectors, Triangle and parallelogram law, Scalar & Vector product, Resolution of a vector and its application to inclined plane and lawn roller. Force, Momentum, statement and derivation of conservation of linear momentum, its applications. Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period. Relation between linear and angular (velocity and acceleration), centripetal and centrifugal forces with examples, Expression and its applications. | |
| 3 | 20-28 | Work, Power and Energy | Work: Concept and units, examples of zero work, positive work and negative work. Friction: concept, types, laws of limiting friction, coefficient of friction, methods for reducing friction and its engineering applications, Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications. Energy and its units, kinetic energy, gravitational potential energy with examples and derivations, Mechanical energy, conservation of mechanical energy for freely falling bodies, transformation of energy (examples).Power and its units, power and work relationship, calculation of power (numerical problems). | |
| 4 | 29-36 | Rotational Motion | Translational and rotational motions with examples. Definition of Torque and angular momentum with examples. Conservations of Angular momentum, and its applications. Moment of Inertia and its physical significance, radius of Gyration, Theorems of parallel and perpendicular axis. Moment of Inertia of rod, disc, ring and sphere | |
| 5 | 37-47 | Properties of Matter | Elasticity: Definition of Stress and strain, types of Modulii of elasticity, Hook's law, Significance of Stress strain curve. Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications. Surface Tension: Concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula, applications of surface tension, effect of temperature and impurity on surface tension. | |
| 6 | 48-56 | Heat and Thermometry | Concept of heat and temperature. Modes of heat transfer of Heat with examples, scales of temperature and their relationship, Types of Thermometer and their uses. Expansion of solids, liquids and gases, coefficient of linear, surface and cubicalexpansions and relation amongst them, Co-efficient of thermal conductivity | |

(Pritam Chand)
Lecturer Physics

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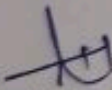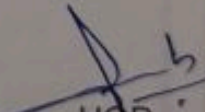**Course: Diploma**                                   **Subject: Applied Chemistry**

### Lesson Plan for syllabus Coverage: Theory-56 Hours, Practical-28 Hours.

| S. No | Lecture No. | Topic | Syllabus Detail | Remarks |
|---|---|---|---|---|
| 1 | 1-7 | Atomic Structure | Fundamental particles of atoms : Electron, proton, neutron (Definitions). Atomic Structure: Bohr's theory, successes and limitations(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 orbitals , difference between orbit and orbital. Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronicconfiguration(Z=1 to 30). | |
| 2 | 7-14 | Chemical bonding and Solutions | Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example).Lewis concept of covalent bond ($H_2$, $F_2$, HF). Electronegativity, Difference between sigma and pie bond. Electron sea model of metallic bond. Idea of solute, solvent and solution. Methods to express the concentration of solution- molarity (M = mole per liter), molality, mass percentage (Numerical excluded). | |
| 3 | 15-24 | Electro Chemistry and Corrosion | 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. Industrial application of Electrolysis – • Electrometallurgy • Electroplating • Electrolytic refining. Application of redox reactions in electrochemical cells – • Primary cells – dry cell, • Secondary cell - commercially used lead acidstorage battery. Introduction to Corrosion of metals – definition,types of corrosion (electrochemical), $H_2$ liberation and $O_2$ absorption mechanism of electrochemical corrosion. Internal corrosion preventive measures – Purification, alloying and heat treatment and External corrosion preventive measures: metal (anodic, cathodic) coatings | |
| 4 | 25-31 | 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(a).Crushing and grinding (b) Concentration of ore (Levigation, Froth flotation, Magnetic separation) (c ) Extraction( Roasting and calcinations & smelting) (d) Refining (Electro refining, zone refining).Extraction of - iron from haematite ore using blast furnace along with reactions. Alloys – definition, purposes of alloying, ferrous alloys (Invar steel) and non-ferrous(Simple Brass & Bronze, Nichrome, Duralumin, Magnelium) with suitable examples, properties and applications | |

| 5 | 32-39 | Water | Classification of soft and hard water based on soap test, salts causing water hardness, units of hardness(mg/L and ppm) 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.) i) water softening techniques- zeolite process ii). Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization. Properties of water used for human consumption for drinking and cooking purposes from any water sources and Indian standard specification of drinking water. | |
|---|---|---|---|---|
| 6 | 40-46 | Fuels | Definition of fuel and combustion of fuel, classification of fuels calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula. Characteristics of good fuel.Petrol and diesel - fuel rating (octane and cetane numbers).Chemical composition, calorific values and applications of LPG, CNG, water gas, producer gas and biogas | |
| 7 | 47-53 | 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, cloud and pour point only) and chemical properties (coke number, total acid number, saponification value) of lubricants. | |
| 8 | 54-56 | Polymers | Monomer, homo and co polymers , degree of polymerization. simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using Polythene, PVC, PS, PTFE, nylon-6,6 and Bakelite only).Vulcanization of rubber and properties of vulcanised rubber | |

(Anil Kumar)
Lecturer Chemistry

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