

1st Semester Notes PDF of Polytechnic - Free Download

1st Year 1st Semester - Theory Syllabus

1. Mathematics-I

Unit 1: Algebra

- Logarithm: Definition of natural and common logarithm; general properties and simple problems
- Complex Numbers: Definition, real & imaginary parts, equality, conjugate; Modulus and Argument; Polar and Cartesian forms; algebraic operations; De Moivre's Theorem; cube roots of unity
- Quadratic Equations: Definition, finding roots, conjugate roots, nature of roots using discriminant, relation between roots and coefficients, formation of quadratic equations
- Binomial Theorem: Factorial, permutation & combination; Binomial Theorem for any index; General term and Middle term; Expansion of $(1+x)^{-1}$, $(x-1)^{-1}$, exponential & logarithmic series

★ Notes PDFs Links

- Logarithm: <https://polynotesHub.co.in/logarithm-questions-and-answers-pdf-of-wbscte/>
- Complex Number: <https://polynotesHub.co.in/complex-number-questions-and-answers-pdf/>
- Quadratic Equation: <https://polynotesHub.co.in/quadratic-equation-questions-and-answers-pdf/>
- Binomial Theorem: <https://polynotesHub.co.in/binomial-theorem-questions-and-answers-pdf/>

Unit 2: Vector Algebra

- Definition of vector and types of vectors
- Position vector and Ratio formula
- Rectangular resolution of a vector
- Equality, addition, subtraction of vectors and multiplication by a scalar
- Scalar (dot) and Vector (cross) product of two vectors with properties
- Application of dot product: work done by a force, projection of a vector
- Application of cross product: area of a triangle/parallelogram, moment of a force

★ Notes PDFs Links

- Vector Algebra: <https://polynotesHub.co.in/vector-algebra-questions-and-answers-pdf/>

Unit 3: Trigonometry

- Trigonometrical angles, measurement in degree, radian and grade
- Trigonometrical ratios of angles, associated angles, standard angles
- Compound angles formula, multiple and sub-multiple angles
- Solutions of trigonometrical equations
- Inverse circular functions
- Properties of triangle: basic formulae

★ Notes PDFs Links

- Trigonometrical angles: <https://polynotesHub.co.in/trigonometrical-angles-questions-and-answers/>
- Trigonometrical Ratios: <https://polynotesHub.co.in/trigonometrical-ratios-questions-and-answers/>
- Compound Angles: <https://polynotesHub.co.in/trigonometric-compound-angles-questions-and-answers/>

- Inverse Circular Function: <https://polynoteshub.co.in/inverse-circular-function-questions-and-answers/>
- Properties of Triangle: <https://polynoteshub.co.in/properties-of-triangle-questions-and-answers/>

Unit 4: Function, Limit & Continuity, Derivative

- Function: variables & constants, definition, domain and range, types of functions, graphs of trigonometric functions
- Limit & Continuity: definition of limit, fundamental theorem, standard limits, continuity of functions
- Derivative: definition, derivatives of standard functions, rules of differentiation (sum, difference, product, quotient)
- Derivatives of composite functions (Chain Rule), inverse circular functions, implicit and logarithmic differentiation
- Derivative of parametric functions; second order derivatives
- Application of derivatives: physical & geometrical interpretation, increasing-decreasing functions, velocity & acceleration, Maxima-Minima

★ Notes PDFs Links

- Limit: <https://polynoteshub.co.in/limit-questions-and-answers-pdf-of-wbscte-board/>
- 1st Order Derivatives: <https://polynoteshub.co.in/1st-order-derivatives-questions-and-answers-pdf/>
- 2nd Order Derivatives: <https://polynoteshub.co.in/2nd-order-derivatives-questions-and-answers-pdf/>
- Maxima and Minima: <https://polynoteshub.co.in/maxima-and-minima-questions-and-answers-pdf/>

2. Applied Physics-I

Unit 1: Physical World, Units and Measurements

- Physical quantities: fundamental and derived; units and systems of units (CGS and SI)
- Dimensions and dimensional formulae; principle of homogeneity of dimensions
- Dimensional equations and applications; limitations of dimensional analysis
- Measurements: measuring instruments, least count, types of measurement
- Errors in measurement (systematic and random), absolute & relative error, error propagation, significant figures

★ Notes PDFs Links

- Physical Quantities: <https://polynoteshub.co.in/physical-quantities-notes-pdf/>
- Dimensions and Dimensional Formulae: <https://polynoteshub.co.in/dimensions-and-dimensional-formulas-notes-pdf/>
- Measurements and Errors: <https://polynoteshub.co.in/measurements-and-errors-notes-pdf/>

Unit 2: Force and Motion

- Force, Momentum, Conservation of linear momentum and its applications
- Impulse and impulsive force
- Circular motion: angular displacement, velocity, acceleration, frequency, time period
- Relation between linear and angular velocity/acceleration
- Centripetal and centrifugal forces; banking of roads and bending of cyclist

★ Notes PDFs Links

- Force and Momentum: <https://polynoteshub.co.in/force-and-momentum-notes-pdf/>
- Circular Motion: <https://polynoteshub.co.in/circular-motion-notes-pdf/>

Unit 3: Work, Power and Energy

- Work: concept, units, zero/positive/negative work
- Friction: concept, types, laws of limiting friction, coefficient of friction
- Work done in moving an object on a rough inclined plane
- Energy: kinetic and potential energy, conservation of mechanical energy, transformation of energy
- Power: units, power–work relationship

★ Notes PDFs Links

- Work: <https://polynoteshub.co.in/work-notes-pdf-formula-unit-types/>
- Friction: <https://polynoteshub.co.in/friction-notes-pdf-types-and-laws-of-friction/>
- Energy: <https://polynoteshub.co.in/energy-notes-pdf-units-and-types-of-energy/>
- Power: <https://polynoteshub.co.in/power-notes-pdf-types-and-its-units/>

Unit 4: Rotational Motion

- Translational and rotational motion with examples
- Torque and angular momentum, their relation; conservation of angular momentum
- Moment of inertia and its physical significance; radius of gyration
- Theorems of parallel and perpendicular axes
- Moment of inertia of rod, disc, ring and sphere (hollow and solid)

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- Translational and Rotational Motion: <https://polynoteshub.co.in/translational-and-rotational-motion-notes-pdf/>
- Moment of Inertia: <https://polynoteshub.co.in/moment-of-inertia-notes-pdf/>

Unit 5: Properties of Matter

- Elasticity: stress and strain, moduli of elasticity, Hooke's law, stress-strain curve
- Surface tension: concept, cohesive and adhesive forces, angle of contact, capillary rise
- Viscosity and coefficient of viscosity: terminal velocity, Stoke's law
- Hydrodynamics: stream line and turbulent flow, Reynold's number, equation of continuity, Bernoulli's Theorem

★ Notes PDFs Links

- Elasticity: <https://polynoteshub.co.in/elasticity-notes-pdf/>
- Surface Tension: <https://polynoteshub.co.in/surface-tension-notes-pdf/>
- Viscosity: <https://polynoteshub.co.in/viscosity-and-coefficient-of-viscosity-notes/>
- Hydrodynamics: <https://polynoteshub.co.in/hydrodynamics-notes-pdf/>

Unit 6: Heat and Thermometry

- Concept of heat and temperature; measurement of heat and temperature
- Modes of heat transfer: conduction, convection, radiation; coefficient of thermal conductivity

- Expansion of solids, liquids and gases; coefficients of linear, surface and cubical expansion
- Specific heats C_p & C_v of a gas and their relationship

★ Notes PDFs Links

- Heat and Temperature: <https://polynoteshub.co.in/heat-and-temperature-notes-pdf/>
- Expansion of Solids: <https://polynoteshub.co.in/expansion-of-solids-notes-pdf/>

3. Applied Chemistry

Unit 1: Atomic Structure, Chemical Bonding and Solutions

- Rutherford model, Bohr's theory, hydrogen spectrum, Heisenberg uncertainty principle
- Quantum numbers, shapes of s/p/d orbitals, Pauli's exclusion principle, Hund's rule, Aufbau rule, electronic configuration
- Chemical bonding: ionic, covalent, metallic, hydrogen bonds; hybridization (sp^3 , sp^2 , sp)
- Solutions: solute, solvent, solution; molarity, ppm, mass %, volume %, mole fraction

★ Notes PDFs Links

- Atomic Structure: <https://polynoteshub.co.in/atomic-structure-notes-pdf/>
- Chemical Bonding: <https://polynoteshub.co.in/chemical-bonding-and-solutions-notes-pdf/>

Unit 2: Water

- Water distribution on Earth; hard and soft water, salts causing hardness, units of hardness
- Problems from hard water use in boilers (scale, sludge, foaming, priming, corrosion)
- Measurement of hardness by EDTA method; TDS and alkalinity estimation
- Water softening: soda-lime process, zeolite process, ion exchange process
- Municipal water treatment: sedimentation, coagulation, filtration, sterilization
- Drinking water standards

★ Notes PDFs Links

- Drinking Water and Water Standards: <https://polynoteshub.co.in/drinking-water-and-water-standards-notes-pdf/>
- Water Hardness: <https://polynoteshub.co.in/water-hardness-notes-pdf/>
- Hard Water and Water Treatment: <https://polynoteshub.co.in/hard-water-and-water-treatment-notes-pdf/>

Unit 3: Engineering Materials

- Occurrence of metals, ores of iron/aluminium/copper, gangue, flux, slag; general principles of metallurgy
- Extraction of iron (blast furnace), aluminium from bauxite, copper extraction
- Alloys: definition, purpose, ferrous and non-ferrous alloys with applications
- Cement, glasses, refractory and composite materials (composition-based applications)
- Polymers: monomer, homo/co-polymers, degree of polymerization; thermoplastics and thermosetting plastics; rubber and vulcanization

★ Notes PDFs Links

- Metallurgy and Alloys: <https://polynoteshub.co.in/metallurgy-and-alloys-notes-pdf/>

- Cement: <https://polynoteshub.co.in/portland-cement-glass-refractory-notes-pdf/>
- Polymers: <https://polynoteshub.co.in/polymers-notes-pdf/>

Unit 4: Chemistry of Fuels and Lubricants

- Fuel: definition, combustion, classification, calorific values (HCV, LCV), Dulong's formula
- Proximate and ultimate analysis of coal; fuel rating of petrol/diesel (octane, cetane numbers)
- Composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas, biogas
- Lubrication: function, classification, hydrodynamic & boundary lubrication; physical and chemical properties of lubricants

★ Notes PDFs Links

- Fuel: <https://polynoteshub.co.in/fuels-and-combustion-notes-pdf/>
- Lubrication: <https://polynoteshub.co.in/lubrication-notes-pdf/>

Unit 5: Electro Chemistry

- Oxidation, reduction and redox reactions; electrolytes and non-electrolytes
- Faraday's laws of electrolysis; concept of pH and buffer
- Industrial applications of electrolysis: electrometallurgy, electroplating, electrolytic refining
- Electrochemical cells: primary cells (dry cell), secondary cells (lead storage battery), fuel and solar cells
- Corrosion: definition, types (chemical & electrochemical), mechanism, factors affecting rate
- Corrosion prevention: purification, alloying, heat treatment, coatings, organic inhibitors

★ Notes PDFs Links

- Electrochemistry: <https://polynoteshub.co.in/electrochemistry-notes-pdf/>
- Corrosion: <https://polynoteshub.co.in/corrosion-notes-pdf/>

4. Communication Skills in English

Unit 1: Communication – Theory and Practice

- Basics of communication: meaning, definition, process of communication
- Types of communication: formal/informal, verbal, non-verbal, written; barriers to effective communication
- 7 Cs of effective communication
- Art of effective communication: choosing words, voice, modulation, clarity, time, simplification
- Technical communication

★ Notes PDFs Links

- Communication Theory and Practice: <https://polynoteshub.co.in/communication-skills-theory-and-practice-notes/>

Unit 2: Soft Skills for Professional Excellence

- Soft skills vs hard skills; importance of soft skills
- Life skills: self-awareness, self-analysis, adaptability, social skills, emotional intelligence, interpersonal relationship, empathy
- Applying soft skills across cultures: corporate work culture, work persona, professionalism, time management

- Case studies

✦ Notes PDFs Links

- Soft Skills for Professional Excellence: <https://polynoteshub.co.in/soft-skills-for-professional-excellence-notes/>

Unit 3: Reading Comprehension

- Note taking, comprehension
- Vocabulary enhancement and grammar exercises based on reading texts

✦ Notes PDFs Links

- Reading Comprehension: <https://polynoteshub.co.in/reading-comprehension-notes-pdf-free-download/>

Unit 4: Professional Writing

- The art of writing Report and Memo
- CVs
- Letters: job application and business letters
- Drafting e-mail, minutes of a meeting, etc.

✦ Notes PDFs Links

- Professional Writing: <https://polynoteshub.co.in/professional-writing-notes-pdf-free-download/>

Unit 5: Vocabulary and Grammar

- Remedial grammar and exercises
- Professional workplace communication
- Parts of speech, active and passive voice, tenses

✦ Notes PDFs Links

- Vocabulary and Grammar: <https://polynoteshub.co.in/vocabulary-and-grammar-notes-pdf-free-download/>

5. Engineering Graphics

Unit 1: Basics of Drawing

- Letters and numerals (single stroke vertical)
- Conventions of lines and their applications
- Concept of Representative Fraction (RF), reduced/enlarged/full scale, plain scale & diagonal scale
- Dimensioning techniques: unidirectional and aligned systems

✦ Notes PDFs Links

- Basics of Drawing: <https://polynoteshub.co.in/letters-and-numbers-from-technical-drawing/>

Unit 2: Geometrical Construction

- Regular polygons, ellipse, parabola, hyperbola

- Curves through given points, cycloid, involute of a circle and polygon

★ Notes PDFs Links

- Geometrical Construction: <https://polynoteshub.co.in/geometrical-construction-from-technical-drawing/>

Unit 3: Orthographic Projection

- Concept of First Angle & Third Angle projection
- Projections of lines: parallel and inclined to reference planes (First Angle Method)
- Projections of solid bodies: regular polygonal pyramid, cylinder, cone (First Angle Method)

★ Notes PDFs Links

- Orthographic Projection: <https://polynoteshub.co.in/orthographic-projection-from-technical-drawing/>

Unit 4: Conversion of Pictorial Views into Orthographic Views

- Conversion of pictorial views into orthographic views (simple objects, First Angle Projection)

★ Notes PDFs Links

- Pictorial View into Orthographic Views: <https://polynoteshub.co.in/pictorial-views-into-orthographic-views/>

Unit 5: Isometric Projections

- Introduction to isometric projections, isometric scale and isometric views
- Conversion of orthographic views into isometric views/projections (prism, pyramid, cone, cylinder)

★ Notes PDFs Links

- Isometric Projection: <https://polynoteshub.co.in/isometric-projections-from-technical-drawing/>

Unit 6: Free Hand Sketching

- Free hand sketches of engineering elements: thread profile, nuts, bolts, studs, set screws, washers, locking arrangements and their conventional representation

★ Notes PDFs Links

- Free Hand Sketching: <https://polynoteshub.co.in/free-hand-sketches-of-engineering-elements/>

Unit 7: Introduction to AutoCAD

- Draw commands: Line, Circle, Polygon, Arc, Ellipse, Polyline, Fillet, Chamfer, Hatch, Array
- Modify commands: Offset, Trim, Extend, Erase, Break, Lengthen, Copy, Move, Mirror, Stretch, Match Properties
- View, Dimensioning and Text commands; Format: Limits, Layers, Pan
- Making simple 2D drawings in AutoCAD

★ Notes PDFs Links

- AutoCAD Commands and Toolbar: <https://polynoteshub.co.in/autocad-commands-and-toolbars-notes-pdf/>