IIITH UGEE 2025 Syllabus for SUPR (Subject Proficiency)

The SUPR section of IIITH UGEE exam concentrated on evaluating the candidate's proficiency in Mathematics and Physics.

IIITH UGEE 2025 Syllabus for Physics

Candidates can check the table to get a detailed view of IIITH UGEE Syllabus 2025 for Physics.

Chapters	Topics
Electrostatics	● Coulomb's law of electrostatics. ● Electric field and field lines. ● Electric potential and potential difference. ● Gauss's law: Application to symmetric charge distributions (plane, sphere, cylinder). ● Capacitance: Parallel plate capacitor, Energy stored in capacitors.
Gravitation	● Newton's law of gravitation: Gravitational constant. ● Gravitational field and potential. ● Escape velocity and orbital velocity. ● Kepler's laws of planetary motion. ● Geostationary satellites.
Rotational Motion	● Angular velocity and acceleration. ● Moment of inertia: Parallel and perpendicular axis theorems. ● Torque and angular momentum. ● Conservation of angular momentum. ● Rotational kinetic energy. ● Rolling motion, radius of gyration.
Work, Energy, and Power	● Work done by a force: Work-energy theorem. ● Kinetic energy and potential energy: Conservative and non-conservative forces. ● Law of conservation of mechanical energy. ● Power: Relation between power and work, Instantaneous power.
Newton's Laws of Motion	● First law: Concept of force, Inertia, Newton's first law. ● Second law: Force and acceleration, F = ma. ● Third law: Action-reaction pairs, Applications like tension, pulley systems, and contact forces.
Kinematics	● Motion in a straight line: Distance, displacement, speed, velocity, acceleration, and their graphical representation. ● Motion in a plane: Projectile motion, Uniform circular motion. ● Relative motion: Relative velocity in one and two-dimension

Current Electricity	● Ohm’s law, Electrical resistivity, Conductivity. ● Kirchhoff's laws: Series and parallel resistors, Simple DC circuits. ● Wheatstone bridge, Meter bridge, Potentiometer. ● Heating effect of current, Power dissipated in a resistor. ● RC circuits and their charging/discharging behaviour.
Magnetism	● Biot-Savart law and its applications. ● Ampere’s law: Magnetic field due to current in a straight wire, circular loop, solenoid. ● Lorentz force law and its applications. ● Magnetic dipole, Magnetic field due to dipole. ● Moving coil galvanometer, its current sensitivity.
Electromagnetic Induction	● Faraday’s law and Lenz’s law of electromagnetic induction. ● Self and mutual inductance. ● Energy stored in inductors. ● AC generators and transformers. ● Eddy currents and their applications.
Optics	● Reflection and refraction: Laws of reflection, Snell's law, Total internal reflection. ● Lenses and mirrors: Lens maker’s formula, Combination of lenses. ● Wave optics: Young’s double slit experiment, Interference, Diffraction, Polarization. ● Optical instruments: Microscopes and telescopes.
Thermodynamics	● Zeroth law of thermodynamics, the concept of temperature. ● First law of thermodynamics: Internal energy, Work done by and on the system. ● Second law: Heat engines and refrigerators, Carnot engine, Efficiency. ● Concept of entropy and disorder. ● Thermal expansion of solids, liquids, and gases. ● Heat transfer: Conduction, convection, radiation, Stefan’s law, Wien’s law

IIITH UGEE 2025 Syllabus for Mathematics

Candidates can check the table to get a detailed view of IIITH UGEE Syllabus 2025 for Mathematics.

Chapters	Topics
Calculus	● Limits and Continuity: Concept of limit, Continuity of functions. ● Differentiation: Derivatives, Rules of differentiation, Higher-order derivatives. ● Application of Derivatives: Tangents and normals, Rate of change, Maxima and minima, Mean value theorem.

	● Integration: Indefinite integrals, Definite integrals, Properties, and applications (area under curves). ● Differential Equations: Formation of differential equations, General and particular solutions.
Vectors and 3D Geometry	● Vectors: Vector algebra, Scalar and vector products, Triple product. ● Equations of lines and planes in space. ● The angle between two vectors, Projection of vectors. ● Distance between two lines, Line and plane, Two planes.
Algebra	● Quadratic Equations: Roots, Discriminant, Nature of roots, Relations between roots. ● Complex Numbers: Argand plane, Polar representation, Euler's form, De Moivre's theorem. ● Sequences and Series: Arithmetic and geometric progressions, Sum to infinity. ● Binomial Theorem: Expansion, General term, Middle terms. ● Permutations and Combinations: Counting principle, Factorials, Permutations of distinct objects. ● Logarithms: Properties, Laws of logarithms, Change of base.
Coordinate Geometry	● Cartesian coordinates, Distance formula, Section formula. ● Straight lines: Slope, Equation of lines, Parallel and perpendicular lines, Distance of a point from a line. ● Circles: Equation of a circle, Tangents, and normals. ● Conic sections: Ellipse, Parabola, Hyperbola, Focus, Directrix, Eccentricity.
Trigonometry	● Trigonometric functions: Domain, Range, Periodicity, Graphs. ● Trigonometric identities and equations. ● Heights and Distances: Angle of elevation and depression problems. ● Inverse trigonometric functions: Properties and application in solving equations.
Probability and Statistics	● Probability theory: Conditional probability, Independent events, Bayes' theorem. ● Random variables: Probability distributions, Expectation, Variance. ● Statistics: Mean, Median, Mode, Standard deviation.

IIITH UGEE 2025 Syllabus for REAP (Research Aptitude)

IIITH UGEE Syllabus for REAP 2025 section focuses on testing the candidate's creative thinking, ability to tackle research-oriented problems and logical reasoning. It helps evaluate the problem-solving skills of the candidates with a focus on higher-order thinking rather than subject specific knowledge. Check the detailed breakdown of the syllabus of IITH UGEE 2025 of REAP section.

IIITH UGEE 2025 Syllabus for REAP - Logical Reasoning And Analytical Skills

Chapters	Topics
Logical Deduction	● Causality and Correlation: Identifying cause-and-effect relationships. ● Logical Sequences: Ordering based on a set of rules or conditions. ● Number and Alphabet Series: Predicting the next element in a sequence based on patterns.
Data Interpretation	● Tables, Graphs, and Charts: Interpretation of data presented in various formats (pie charts, bar graphs, line graphs). ● Logical Interpretation: Analyzing trends, growth, or deductions from data. ● Data Sufficiency: Determining whether the information provided is sufficient to answer a question.
Puzzles	● Seating Arrangement: Questions based on linear or circular seating with conditions. ● Scheduling: Arranging people or events based on constraints. ● Venn Diagrams: Solving problems related to set theory and relationships between groups.
Non-Verbal Reasoning	● Series: Identifying the next figure in a sequence. ● Pattern Completion: Completing missing patterns in figures. ● Mirror and Water Images: Questions based on reflection and symmetry. ● Embedded Figures: Finding a figure hidden within a complex figure. ● Paper Folding and Cutting: Predicting the final shape after a series of folds or cuts.
Verbal Reasoning	● Analogies: Finding relationships between pairs of words. ● Classification: Grouping based on common properties. ● Coding-Decoding: Problems involving coded language. ● Blood Relations: Questions based on family tree relationships. ● Syllogisms: Logical deductions from a set of statements. ● Statements and Assumptions/Conclusions: Analyzing conclusions based on given premises.

IIITH UGEE 2025 Syllabus for REAP - Creative Thinking And Problem Solving

Chapters	Topics

Abstract Thinking	• Pattern Recognition: Identifying underlying patterns in problems and forming strategies for their solution. • Lateral Thinking: Approaching problems from unconventional angles, often requiring creative problem-solving techniques. • Out-of-the-box solutions: Analyzing complex problems that do not have an obvious answer and thinking beyond standard methods to arrive at a solution.
Mathematical Puzzles and Riddles	• Logical Puzzles: Analyzing scenarios like weighing problems, crossing the river puzzles, etc. • Number Puzzles: Solving problems related to number series, magic squares, or numeric relationships. • Geometric Puzzles: Analyzing shapes, dimensions, and geometric reasoning to solve puzzles.
Quantitative and Logical Aptitude	• Basic Arithmetic: Problems involving percentages, ratios, averages, profit, and loss. • Algebraic Reasoning: Logical applications of algebraic expressions and inequalities. • Permutations and Combinations: Counting principles, arrangements, and selections.
Scientific Reasoning	• Experimental Design: Creating hypotheses based on given conditions and analyzing results. • Hypothesis Testing: Evaluating scientific experiments and determining their validity. • Understanding Scientific Concepts: Basic understanding of physical, chemical, and biological phenomena, focusing on reasoning rather than factual recall.

IIITH UGEE 2025 Syllabus for REAP - Research Orientation

Chapters	Topics
Critical Thinking	• Problem Analysis: Analyzing given data or information, identifying gaps, and proposing valid conclusions or solutions. • Data Inference: Concluding given sets of experimental or observational data. • Scientific Argumentation: Evaluating scientific arguments and their reasoning.
Experimental Design and Data Interpretation	• Designing Experiments: Proposing possible experimental setups to solve problems or test hypotheses. • Data Collection and Analysis: Understanding how to collect and analyze data in research settings. • Graphs and Trends: Identifying trends from data presented in graphical forms and making informed inferences.

Understanding Research Questions	● Research Methodology: Basic understanding of how to approach a research problem, including forming hypotheses, designing experiments, and analyzing data. ● Case Studies: Analyzing specific case studies, identifying key issues, and suggesting potential research-based solutions. ● Problem Formulation: Given a scenario or data, formulate a research question and derive logical conclusions.

IIITH UGEE 2025 Syllabus for REAP - General Aptitude

Chapters	Topics
Spatial Reasoning	● Spatial Manipulation of Shapes: Ability to manipulate 2D and 3D objects mentally to predict outcomes. ● Mental Rotation: Rotating 2D/3D shapes and predicting their orientation.
Basic Numeracy	● Simple and Compound Interest. ● Time, Speed, and Distance. ● Time and Work.