| NDA Syllabus 2021 for Mathematics | |
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| **Mathematics Topic** | **NDA Topic-wise syllabus** |
| Algebra | Sets, Venn diagrams, De Morgan laws, Cartesian product, relation, equivalence relation. Real numbers, Complex numbers, Modulus, Cube roots, Conversion of a number in Binary system to Decimals and vice-versa. Arithmetic, Geometric and Harmonic progressions. Quadratic equations, Linear inequations, Permutation and Combination, Binomial theorem and Logarithms. |
| Calculus | Concept of a real valued function, domain, range and graph of a function. Composite functions, one to one, onto and inverse functions. Notion of limit, Standard limits, Continuity of functions, algebraic operations on continuous functions. Derivative of function at a point, geometrical and physical interpretation of a derivative-application. Derivatives of sum, product and quotient of functions, derivative of a function with respect to another function, derivative of a composite function. Second order derivatives. Increasing and decreasing functions. Application of derivatives in problems of maxima and minima |
| Matrices and Determinants | Types of matrices, operations on matrices. Determinant of a matrix, basic properties of determinants. Adjoint and inverse of a square matrix, Applications-Solution of a system of linear equations in two or three unknowns by Cramer's rule and by Matrix Method. |
| Integral Calculus and Differential Equations | Integration as inverse of differentiation, integration by substitution and by parts, standard integrals involving algebraic expressions, trigonometric, exponential and hyperbolic functions. Evaluation of definite integrals—determination of areas of plane regions bounded by curves—applications. Definition of order and degree of a differential equation, formation of a differential equation by examples. General and particular solution of differential equations, solution of first order and first-degree differential equations of various types—examples. Application in problems of growth and decay. |
| Trigonometry | Angles and their measures in degrees and in radians. Trigonometric ratios. Trigonometric identities Sum and difference formulae. Multiple and Sub-multiple angles. Inverse trigonometric functions. Applications-Height and distance, properties of triangles. |

| Vector Algebra | Vectors in two and three dimensions, magnitude and direction of a vector. Unit and null vectors, addition of vectors, scalar multiplication of a vector, scalar product or dot product of two vectors. Vector product or cross product of two vectors. Applications—work done by a force and moment of a force and in geometrical problems. |
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| Analytical Geometry of Two and Three Dimension | Rectangular Cartesian Coordinate system. Distance formula. Equation of a line in various forms. Angle between two lines. Distance of a point from a line. Equation of a circle in standard and in general form. Standard forms of parabola, ellipse and hyperbola. Eccentricity and axis of a conic. Point in a three-dimensional space, distance between two points. Direction Cosines and direction ratios. Equation two points. Direction Cosines and direction ratios. Equation of a plane and a line in various forms. Angle between two lines and angle between two planes. Equation of a sphere. |
| Statistics and Probability | Probability: Random experiment, outcomes and associated sample space, events, mutually exclusive and exhaustive events, impossible and certain events. Union and Intersection of events. Complementary, elementary and composite events. Definition of probability—classical and statistical—examples. Elementary theorems on probability—simple problems. Conditional probability, Bayes' theorem—simple problems. Random variable as function on sample space. Binomial distribution, examples of random experiments giving rise to Binomial distribution. |

## NDA Exam Syllabus – GAT – History

- Forces shaping the modern world;
- Renaissance
- Exploration and Discovery;
- A broad survey of Indian History, with emphasis on Culture and Civilisation
- Freedom Movement in India
- French Revolution, Industrial Revolution and Russian Revolution
- War of American Independence,
- Impact of Science and Technology on Society

- Elementary study of Indian Constitution and Administration

- Concept of one World

- Elementary knowledge of Five-Year Plans of India

- United Nations,

- Panchsheel,

- Panchayati Raj, Democracy, Socialism and Communism

- Role of India in the present world

- Co-operatives and Community Development

- Bhoodan, Sarvodaya,

- National Integration and Welfare State

- Basic Teachings of Mahatma Gandhi

## NDA Exam Syllabus – GAT – Geography

- The Earth, its shape and size

- Ocean Currents and Tides Atmosphere and its composition

- Latitudes and Longitudes

- Temperature and Atmospheric Pressure, Planetary Winds, Cyclones and Anticyclones; Humidity; Condensation and Precipitation

- Concept of time

- Types of Climate

- International Date Line

- Major Natural Regions of the World

- Movements of Earth and their effects

- Regional Geography of India

- Climate, Natural vegetation. Mineral and Power resources;

- Location and distribution of agricultural and Industrial activities

- Origin of Earth. Rocks and their classification

- Important Sea ports and main sea, land and air routes of India

- Weathering—Mechanical and Chemical, Earthquakes and Volcanoes

- Main items of Imports and Exports of India

## NDA Exam Syllabus – GAT – General Science

- Common Epidemics, their causes and prevention

- Difference between the living and non-living

- Food—Source of Energy for man

- Basis of Life—Cells, Protoplasm's and Tissues

- Constituents of food

- Growth and Reproduction in Plants and Animals

- Balanced Diet

- Elementary knowledge of Human Body and its important organs

- The Solar System—Meteors and Comets, Eclipses. Achievements of Eminent Scientists

## NDA Exam Syllabus – GAT – Chemistry

- Preparation and Properties of Hydrogen, Oxygen, Nitrogen and Carbon Dioxide, Oxidation and Reduction.

- Acids, bases and salts.

- Carbon— different forms

- Physical and Chemical Changes

- Fertilizers—Natural and Artificial

- Elements

- Material used in the preparation of substances like Soap, Glass, Ink, Paper, Cement, Paints, Safety Matches and Gunpowder

- Mixtures and Compounds

- Elementary ideas about the structure of Atom

- Symbols, Formulae and simple Chemical Equation

- Atomic Equivalent and Molecular Weights

- Law of Chemical Combination (excluding problems)

- Valency

- Properties of Air and Water

## NDA Exam Syllabus – GAT – Physics

- Physical Properties and States of Matter

- Modes of transference of Heat

- Mass, Weight, Volume, Sound waves and their properties

- Simple musical instruments

- Rectilinear propagation of Light

- Density and Specific Gravity

- Reflection and refraction

- Principle of Archimedes

- Spherical mirrors and Lenses

- Pressure Barometer

- Human Eye

- Motion of objects

- Natural and Artificial Magnets

- Velocity and Acceleration

- Properties of a Magnet

- Newton's Laws of Motion

- Earth as a Magnet

- Force and Momentum

- Static and Current Electricity

- Parallelogram of Forces

- Conductors and Non-conductors

- Stability and Equilibrium of bodies

- Ohm's Law

- Gravitation

- Simple Electrical Circuits

- Elementary ideas of work

- Heating, Lighting and Magnetic effects of Current

- Power and Energy

- Measurement of Electrical Power

- Effects of Heat

- Primary and Secondary Cells

- Measurement of Temperature and Heat

- Use of X-Rays

- General Principles in the working of Simple Pendulum, Simple Pulleys, Siphon, Levers, Balloon, Pumps, Hydrometer, Pressure Cooker, Thermos Flask, Gramophone, Telegraphs, Telephone, Periscope, Telescope, Microscope, Mariner's Compass; Lightning Conductors, Safety Fuses.

## NDA Exam Syllabus – GAT – Current Affairs

Knowledge of Important events that have happened in India in recent years

Prominent personalities of both Indian and International level, Cultural activities and sports activities, Current important world events.