STUDY IQ IAS

UPSC IAS

MATHEMATICS

OPTIONAL 2025

PRATIGYA BATCH

LIVE

Classes & Test Series

By - Ankit Tiwari

(Senior Faculty - Mathematics)

13th July' 23 | **12:00 PM**

It is said that Optional determines the destiny of UPSC journey. It is the most important weapon to conquer this exam. To get into the final list, one must ace the optionals.

Mathematics Optional Batch 2024

StudyIQ is here with its Mathematics Optional Course. Let's start with understanding the Merits of Mathematics Optional.

Scoring optional: The subject is factual and logical rather than opinion-based or subjective, hence easy to score 300+ marks.

Breaks Monotonicity from GS preparation: Apart from the theorems and formulas, you don't have to memorize many things in this paper.

The syllabus of Maths Optional is static in nature and not linked to current affairs, hence no regular updation is required.

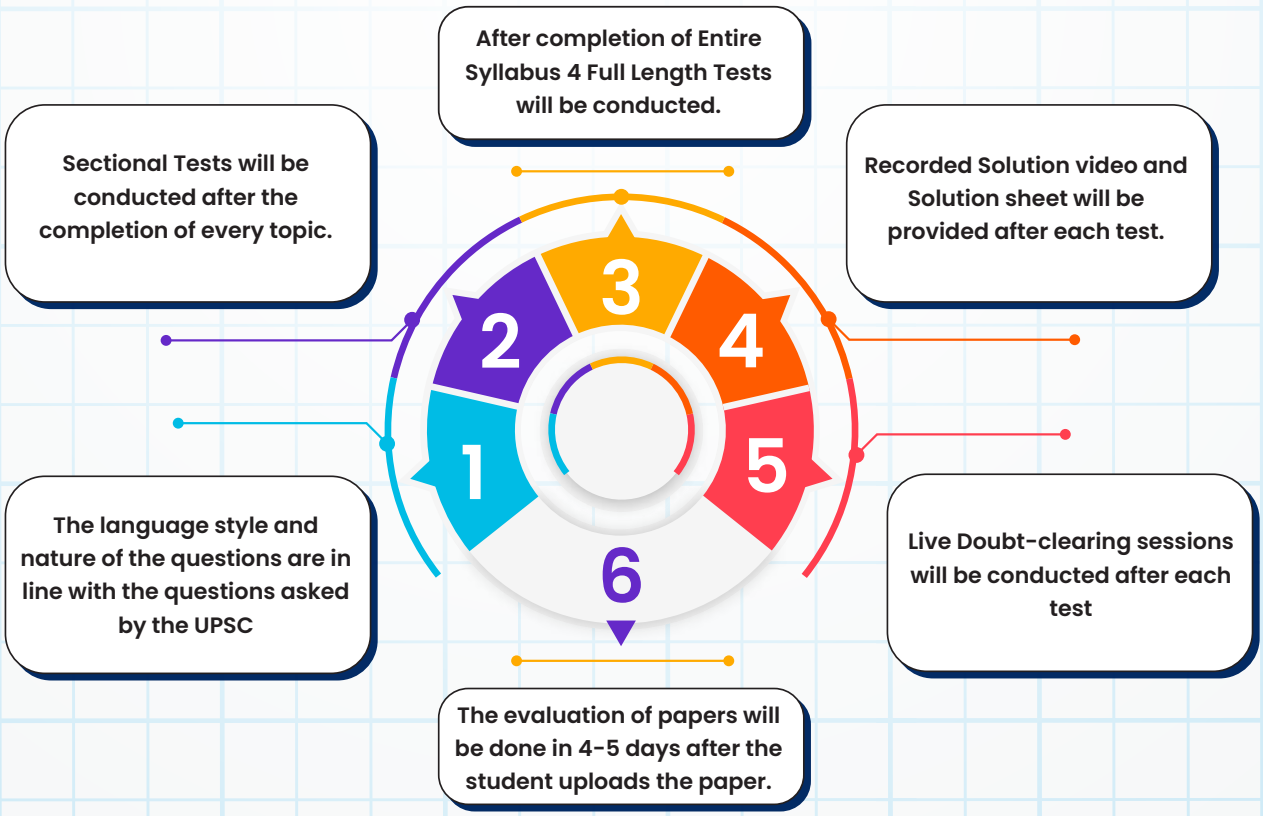
What Do We Pledge to Our Students ?

We Strive to Get The best out of you in this UPSC Journey So If you are enrolling in Pratigya UPSC Optional Batch along with Pratigya P2I Batch and you clear your UPSC Prelims 2025 Exam, your Course fee will be refunded.

Features of the Course

- 600 hours of Live lectures spread over 6 months
- Comprehensive coverage of each and every topic
- More than 1500+ questions in form of practice sheets.
- Formula Sheets will be provided for each and every topic
- Previous Year Questions discussions from Civil Service Exam and Indian Forest Service
- Regular Doubt-clearing sessions by the faculty

Features of the Test Series



Note: During the first few days few orientation sessions will be conducted. The students will be informed regarding the timings of such session in advance.

Schedule of the Classes and Tests

Starting Few Classes will be at 11:00 AM

13th July - Orientation

Date	Paper	Topic	Sub Topic
13th July '24	Paper 1	Linear Algebra	• Introduction, Vector spaces over R & C • Linear Dependence & Independence • Sub Spaces & Bases • Dimensions, Matrix of linear transformation • Rank of Matrix • Nullity • Algebra of Matrices • Row & Column reduction • Echelon form, Rank of Matrices • Types of Matrices • Eigen values & Vectors • Solution of System of Linear equations • Characteristics Values & Vectors • Caley Hamilton theorem • Quadratic form

31st July' 24 Sectional Test on Linear Algebra

Date	Paper	Topic	Sub Topic
1st Aug '24	Paper 1	Analytic Geometry	• Introduction, Co-ordinate System • Conversion of Co-ordinate system • Planes 1 • Planes 2 • Planes 3 • Straight Lines 1 • Straight Lines 2 • Sphere 1 • Sphere 2 • Sphere 3 • Cone 1 • Cone 2 • Cylinder 1 • Cylinder 2 • Introduction to Conicoid • Paraboloid 1 • Paraboloid 2 • Ellipsoid 1 • Ellipsoid 2 • Hyperboloid 1 • Hyperboloid 2

19th Aug' 24 Sectional Test on Analytic Geometry

Date	Paper	Topic	Sub Topic
20th Aug '24	Paper 2	Real Analysis	• Introduction to Real analysis • Real analysis • Sequences • Cauchy's sequence • Infinite & Alternating series • Convergence • Continuity & Differentiability • Riemann Integral 1 • Riemann Integral 2 • Improper Integrals 1 • Improper Integrals 2 • Fundamental Theorems • Integrability • Revision session

20th Sept' 24 Sectional Test on Real Analysis

Date	Paper	Topic	Sub Topic
21st Sept '24	Paper 1	Vector Analysis	• Introduction to Vector Calculus • Scalar & Vector fields • Differentiation of Vector Field of Scalar variables • Gradient & Vectors • Divergence & Curl • Higher Order derivatives, Vector identities • Vector equation • Curvature & Torsion • Serret & Fernet's Formulae • Gauss divergence theorem, Stokes theorem • Stokes theorem, Green's Identities

5th Oct' 24 Sectional Test on Vector Analysis

Date	Paper	Topic	Sub Topic
6th Oct '24	Paper 1	Ordinary Differential Equation	• Introduction to Differential Equation • Formulation of Differential Equation • Linear Differential equation • Integrating Factor • Orthogonal Trajectories • Higher order Differential Equations • Variation of Parameters • Clairaut's equation • Cauchy Euler Equation • Laplace Transform & Theorems • Inverse Laplace transform • Application of Laplace transform

20th Oct' 24 Sectional Test on Ordinary Differential Equation

Date	Paper	Topic	Sub Topic
21st Oct '24	Paper 2	Partial Differential Equation	• Introduction to PDE • Formation of PDE & Family of surfaces in 3D • Solution of Quasi linear PDE • Cauchy's method • Higher order Homogenous PDE • Application of PDE • Vibration strings • Heat equation • Laplace equation • Canonical form

9th Nov' 24 Sectional Test on Partial Differential Equation

Date	Paper	Topic	Sub Topic
10th Nov '24	Paper 1	Calculus	• Introduction to Calculus, Functions • Limits & Continuity • Continuity & Differentiability • Mean Values theorem & problems • Taylor theorem, Indeterminate form • Maxima & Minima, Asymptotes • Curve tracing • Function of 2 or 3 variables • Partial derivatives • Lagrange's method of multiplier • Jacobian Functions • Introduction to Integral Calculus • Reimann's function • Indefinite Integral • Definite Integrals • Infinite & Improper Integrals • Double Integrals • Triple Integrals • Area & Surfaces • Surface & Volume

21st Jan' 25 Sectional Test on Calculus

Date	Paper	Topic	Sub Topic
22nd Jan' 25	Paper 2	Linear Programming	• Introduction to Linear programming • Graphical method & Simplex method • Simplex method • Duality • Basic feasible solution • Optimal solution • Transportation & Assignment problems 1 • Transportation & Assignment problems 2

4th Jan' 25 Sectional Test on Linear Programming

Date	Paper	Topic	Sub Topic
5th Jan '25	Paper 2	Algebra	• Introduction to Abstract Algebra • Groups 1 • Groups 2 • Sub groups, Normal groups • Cosets • Lagrange's theorem • Homomorphism of groups • Cyclic & Quotient groups • Basic Isomorphism theorem • Permutation groups • Cayley's theorem • Rings • Subrings & Ideals • Ideals & Homomorphism • Euclidean Ring, Polynomial ring • Integral domain, Principal ideal domain • Euclidean domain, Unique factorization domain • Finite & Quotient fields • Sylow theorem

14th Feb' 25 Sectional Test on Algebra

Date	Paper	Topic	Sub Topic
15th Feb '25	Paper 2	Complex Analysis	• Introduction to Complex Numbers • Limits, Continuity & Differentiability • Analytic Functions • Cauchy Riemann's equation, Cauchy theorem • Cauchy Integral Formula • Power series representation, Singularities • Taylor, Laurent series • Contour Integration • Cauchy Residue theorem

1st Mar' 25 Sectional Test on Complex Analysis

Date	Paper	Topic	Sub Topic
2nd Mar '25	Paper 2	Numerical Analysis & Computer Programming	• Solution of Algebraic equation • Bisection & Regular falsi method • Newton Raphson, Gauss elimination • Gauss Jordan, gauss seidel method • Newton Interpolation, Lagrange's Interpolation • Simpson rule, Trapezoidal rule • Gaussian quadrature formula, Numerical solution of ODE • Euler's & Ranga Kutta method • Binary, Octal, Hexa decimal Number system • Conversion & Algebra of Binary numbers • Elements of Computer system & Concept of memory • Truth table, Boolean algebra • Representation of Integers, Algorithm & Flowcharts

16th Mar' 25 Sectional Test on Numerical Analysis & Computer Programming

Date	Paper	Topic	Sub Topic
17th Mar '25	Paper 1	Dynamics & Statics	• Rectilinear motion, simple harmonic motion, motion in a plane, projectiles • Constrained motion • Work and energy, conservation of energy • Kepler's laws, orbits under central forces. • Equilibrium of a system of particles • Work and potential energy, friction, Common catenary • Principle of virtual work • Stability of equilibrium, equilibrium of forces in three dimensions.

2nd Apr' 25 Sectional Test on Dynamics & Statics

Date	Paper	Topic	Sub Topic
3 Apr ' 2025	Paper 2	Mechanics & Fluid Dynamics	• Introduction to Fluid • Euler's & Lagrange's equation • Kinematics of Fluid flow • Boundary condition • Stream line flow, Path of particles • Sources & Sinks • Method of Images • Axisymmetric flow • Vortex flow 1 • Vortex flow 2 • Navier's – Stokes equation • Introduction to Mechanics • Moment of Inertia • D Alembert's principle • Generalized co-ordinates • Lagrange's equation • Hamilton equation • Motion of body in 2D

16th Apr' 25 Sectional Test on Mechanics & Fluid Dynamics

Test	Paper
23th Apr ' 25	Full Length Paper 1
30th Apr' 25	Full Length Paper 2
6th May' 25	Full Length Paper 1
13th May' 25	Full Length Paper 2

*** Please note that this is a tentative schedule of the batch and the dates may vary.**

*** Initial few orientation classes will be held from 11:00-12:30. .**