STUDY IQ IAS

MATHEMATICS

OPTIONAL

ADVANCE COURSE

15th November 2025

Why Choose This Course?

- Complete Maths Optional Preparation in 3 months, with full Mathematics Optional coverage.
- Over **800 UPSC Level Questions** designed for UPSC Exam Success.
- Those who have **Finished the Mathematics Foundation Course.**
- UPSC/IFoS/State PSC and PG College Exam Aspirants.
- Those who want to cover the complete syllabus through practice questions.

What Do You Get

Complete Syllabus Mastery
84 sessions: 78 pre-recorded, 6 live for deep learning and interaction.

Question Bank of 800+
60+ rigorous questions per Topic, fully explained.

Dual Format Solutions
Step-by-step video and handwritten PDF solutions.

Live Doubt-Clearing
Fortnightly Zoom sessions for real-time answers.

Special Focus On Physics Related Topics
Apply mathematical techniques to physics-heavy topics.

Exam-Focused Books & P.Y.Qs
Learn from standard reference books and previous year questions.

Swift Revision Support
Last-minute revision

76-4000-3000

Course Structure

Date	Module	Sessions	What You'll Master
17 Nov	Linear Algebra	6	• 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
24 Nov	Calculus	6	• 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

Course Structure

Date	Module	Sessions	What You'll Master
1 Dec	Analytical (Solid) Geometry	6	• 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
8 Dec	ODE	6	• 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

Course Structure

Date	Module	Sessions	What You'll Master
15 Dec	Vector Calculus	6	• 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
23 Dec	Statics & Dynamics	6	• 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.
29 Dec	Partial Differential Equations	6	• 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

Course Structure

Date	Module	Sessions	What You'll Master
5 Jan 26	Linear Programming	6	• Introduction to Linear programming • Graphical method & Simplex method • Simplex method • Duality • Basic feasible solution • Optimal solution • Transportation & Assignmentproblems 1 • Transportation & Assignment problems 2
12 Jan 26	Real Analysis	6	• 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
19 Jan 26	Modern Algebra	6	• 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

Course Structure

Date	Module	Sessions	What You'll Master
26 Jan	Numerical Analysis & Computer Programming	6	• 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
2 Feb	Mechanics & Fluid Dynamics	6	• 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

Course Structure

Date	Module	Sessions	What You'll Master
9 Feb	Complex Analysis	6	• 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

Tentative Dates	Doubt Session No.
6 Dec	Dout Session 1
20 Dec	Dout Session 2
3 Jan	Dout Session 3
17 Jan	Dout Session 4
31 Jan	Dout Session 5
14 Feb	Dout Session 6

Note : Live Zoom Doubts Session will be taken on 3rd week's Saturday after every 2 chapters will be updated in the course.

Extras That Matter

- **Direct Faculty Access Via Zoom** for doubts and guidance.
- **Handwritten PDFs** for every major topic, ideal for last-minute review.
- **Progress Tracking Dashboard** to monitor learning and achievements.
- Coverage Of **Mathematics** Topic For UPSC Level Exams

How It Works

- **Enroll** to get instant access to all sessions.
- **Learn at Your Own Pace** with flexible video and PDF materials.
- **Join Live Doubt Sessions** every two weeks.
- **Revise Efficiently** using quick notes and cheat-sheets.

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Our Faculty

Ankit Tiwari

Mathematics | UPSC Faculty

- 6 years of teaching experience in Mathematics for UPSC and other competitive examinations
- B.Tech graduate from NIT(National Institute of Technology) Raipur, with a strong academic foundation
- Reached the Interview Stage of the UPSC Civil Services / Eng. Services Examination
- Renowned for his concept-focused teaching, exam-oriented strategies, and exceptional clarity in numerical problem-solving

A mentor who bridges fundamentals with performance, helping aspirants master both theory and application.

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Price: ~~₹15,999~~

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Director's Desk

Dear UPSC Aspirants,

At StudyIQ IAS, we know that the journey to becoming a civil servant is not just about studying—it's about dreams, struggles, and relentless perseverance. We have walked this path with thousands of aspirants, learning from your challenges, evolving with your needs, and celebrating your victories. Today, we take that commitment one step further with our most comprehensive and inclusive program yet—The FOUNDATION Batch.

This is not just another course; it's a game-changer. Whether you are starting fresh or refining your strategy, FOUNDATION provides everything you need—from live & recorded lectures, handwritten notes, structured test series, daily quizzes, answer writing practice, interview guidance, and one-on-one mentorship—all in a single, well-structured program. We believe financial constraints should never hold back a dream, which is why we offer affordable pricing, a full fee refund for those who clear Prelims, and ₹11,000 rewards for top performers.

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Best Regards,
Director's Desk