AE	GATE Aerospace Engineering Syllabus 2026

Section1: Engineering Mathematics

Core Topics:

Linear Algebra: Vector algebra, Matrix algebra, systems of linear equations, rank of a matrix, eigen values and eigen vectors.

Calculus: Functions of single variable, limits, continuity and differentiability, mean value theorem, chain rule, partial derivatives, maxima and minima, gradient, divergence and curl, directional derivatives. Integration, Line, surface and volume integrals. Theorems of Stokes, Gauss and Green.

Differential Equations: First order linear and nonlinear differential equations, higher order linear ODEs with constant coefficients. Partial differential equations and separation of variables methods.

Special Topics: Fourier Series, Laplace Transforms, Numerical methods for linear and nonlinear algebraic equations, Numerical integration and differentiation. Complex analysis. Probability and statistics.

Section 2: Flight Mechanics

Core Topics:

Basics

Atmosphere: Properties, standard atmosphere. Classification of aircraft. Airplane (fixed wing aircraft) configuration and various parts. Pressure altitude; equivalent, calibrated, indicated air speeds; Primary flight instruments: Altimeter, ASI, VSI, Turn-bank indicator. Angle of attack, sideslip; Roll, pitch & yaw controls. Aerodynamic forces and moments.

Airplane Performance: Drag polar; take-off and landing; steady climb and descent; absolute and service ceiling; range and endurance, load factor, turning flight, V-n diagram. Winds: head, tail and cross winds.

Static Stability: Stability and control derivatives; longitudinal stick fixed and free stability; horizontal tail position and size; directional stability, vertical tail position and size; lateral stability. Wing dihedral, sweep & position; hinge moments, stick forces.

Special Topics: Dynamic stability: Euler angles; Equations of motion; Decoupling of longitudinal and lateral-directional dynamics; longitudinal modes; lateral-directional modes.

Section 3: Space Dynamics

Core Topics:

Central force motion, determination of trajectory and orbital period in simple cases. Kepler's laws; escape velocity.

No Special Topics

Section 4: Aerodynamics

Core Topics:

Basic Fluid Mechanics: Conservation laws: Mass, momentum and energy (Integral and differential form); Dimensional analysis and dynamic similarity;

Potential Flow Theory: sources, sinks, doublets, line vortex and their superposition. Elementary ideas of viscous flows including boundary layers.

Airfoils and Wings: Airfoil nomenclature; Aerodynamic coefficients: lift, drag and moment; Kutta-Joukoswki theorem; Thin airfoil theory, Kutta condition, starting vortex; Finite wing theory: Induced drag, Prandtl lifting line theory; Critical and drag divergence Mach number.

Compressible Flows: Basic concepts of compressibility, One-dimensional compressible flows, Isentropic flows, Fanno flow, Rayleigh flow; Normal and oblique shocks, Prandtl-Meyer flow; Flow through nozzles and diffusers.

Special Topics: Wind Tunnel Testing: Measurement and visualization techniques. Shock - boundary layer interaction.

Section 5: Structures

Core Topics:

Strength of Materials: Stress and strain: Three-dimensional transformations, Mohr's circle, principal stresses, Three-dimensional Hooke's law, Plane stress and strain. Failure theories: Maximum stress, Tresca von Mises. Strain energy. Castigliano's principles. Statically determinate and indeterminate trusses and beams. Elastic flexural buckling of columns.

Flight Vehicle Structures: Characteristics of aircraft structures and materials. Torsion, bending and shear of thin-walled sections. Loads on aircraft.

Structural Dynamics: Free and forced vibrations of undamped and damped SDOF systems. Free vibrations of undamped 2-DOF systems.

Special Topics: Vibration of beams. Theory of elasticity: Equilibrium and compatibility equations, Airy's stress function.

Section 6: Propulsion

Core Topics:

Basics: Thermodynamics, boundary layers, heat transfer, combustion and thermo chemistry.

Aerothermodynamics of Aircraft Engines: Thrust, efficiency, range. Brayton cycle.

Engine Performance: ramjet, turbojet, turbofan, turboprop and turboshaft engines. After burners.

Turbomachinery: Axial compressors: Angular momentum, work and compression, characteristic performance of a single axial compressor stage, efficiency of the compressor and degree of reaction, multi-staging.

Centrifugal Compressor: Stage dynamics, inducer, impeller and diffuser.

Axial Turbines: Stage performance.

Rockets: Thrust equation and specific impulse, rocket performance. Multi-staging. Chemical rockets. Performance of solid and liquid propellant rockets.

Special Topics: Aerothermodynamics of non-rotating propulsion components such as intakes, combustor and nozzle. Turbine blade cooling. Compressor-turbine matching, Surge and stall.

Our Courses

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S.No.	Courses	Live Classes	Video lecture Series	Online Test Series	Study Material Books	Fee
1	Complete Package LC+VL+OTS+SM	✓	✓	✓	✓	*Rs. 27000/-*
2	LC+OTS+SM	✓	✗	✓	✓	*Rs. 22000/-*
3	VL+OTS+SM	✗	✓	✓	✓	*Rs. 22000/-*
4	SM	✗	✗	✗	✓	*Rs. 7500/-*
5	OTS	✗	✗	✓	✗	*Rs. 4500/-*
6	SM + OTS			✓	✓	Rs. 10000/-

Our TEAM

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S.No.	Faculty	Institute	Subjects
1	Mr. Prateek Tyagi	M.Tech, IIT Kharagpur	Aircraft Structures, Flight Mechanics
2	Mr. Nishanth MP	PhD Scholar, IISc Bangalore	Fluid Mechanics, Aerodynamics, Space Mechanics
3	Ms. Gagana	PhD Scholar, IIT Madras	Thermodynamics, Propulsion
4	Ms. Guneet Chadha	M.Tech, IIT Kharagpur	Mathematics, General Aptitude
5	Mr. Chetan Agarwal	M.Tech, NIT Jaipur	Mathematics, General Aptitude
6	Mr. Srinivas Yadav	M.Tech, NIT Silchar	Thermodynamics, Propulsion

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web: www.goodwillgate2iit.com
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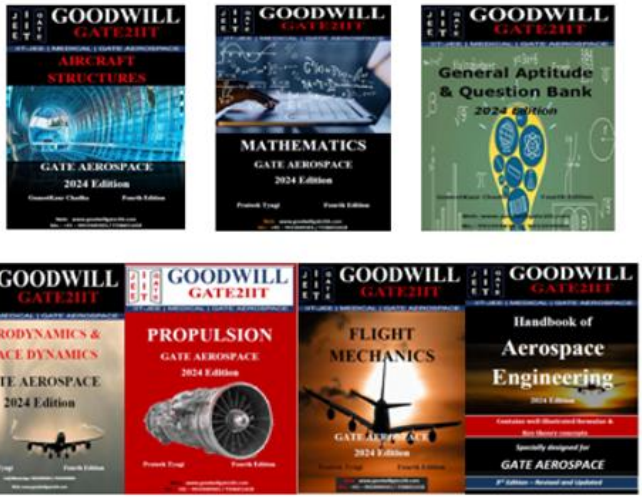
Study Material

- Hard copy books sent to student's address
- Books for
  - Propulsion
  - Aircraft Structures
  - Flight Mechanics
  - Aerodynamics
  - Space Mechanics
  - Mathematics
  - General Aptitude
- Previous year GATE questions solved topic wise
- Examples, additional questions for better understanding
- Every single GATE topic covered



Reference material: https://www.goodwillgate2iit.com/study-material.html

Video Lecture Series

- *600 + Hours of recorded video lectures*
- *Every single previous year GATE question solved*
- *Each theory, derivation, numerical explained*
- Every single topic of GATE syllabus present
- Separate doubt clearing sessions
- Student can attend live sessions for doubt topics

Courses

Link: https://www.goodwillgate2iit.com/gate-aerospace-classroom-coaching.html

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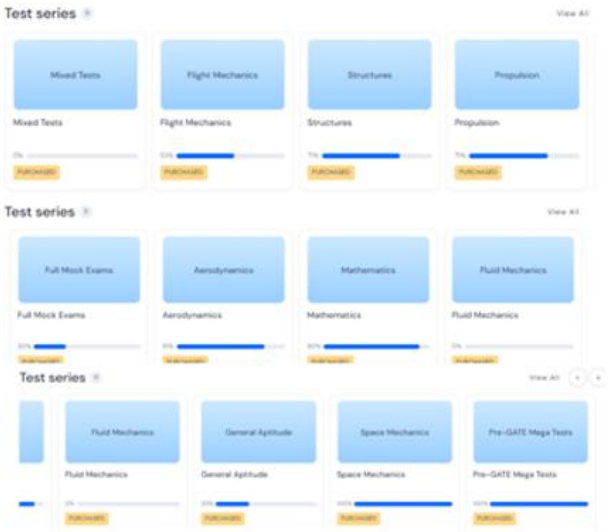
Online Test Series

- 250+ Online Tests
  - Topic wise
  - Subject wise
  - Full mock exams
  - Pre-GATE exams
  - All PY GATE questions topic wise
- 50 + Assignment sheets (pdfs) to be solved in class
- Get AIR in tests among all students
- Exact GATE environment
- Virtual calculator
- Appear for any test, any time, any no. of times
- Review your test mistakes in the report
- Complete solutions



Link: https://www.goodwillgate2iit.com/online-test-series.html

Online Live Interactive Class

Faculty	Institute	Subjects
No. of Days	Mon - Friday	8:30 pm to 10:30 pm
Assignment day & Doubt clearing	Saturday	6 to 9 pm
Subjects	All Core Subjects + Mathematics + General Aptitude	
	Every Wednesday Mathematics Class	
	Every 2nd week General Aptitude	
	Syllabus coverage till mid November Crash course & revision: Nov - Feb	
	Weekly topic wise assignments, Online Tests and solution preparation	
	500 hours of intensive classes 150 hours of assignments and doubt clearing (Online tests separate)	

Link: https://www.goodwillgate2iit.com/gate-aerospace-online-classes.html

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Gate Aerospace 2024 Results

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GATE AEROSPACE 2024

AIR 1 Topper

Kundan Jaiswal

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GATE AEROSPACE 2024

AIR 5 Topper

Peeyush Ramteke

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Our Achievers

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GATE 2023 - AIR - 3, 5, 10, 13, 14, 17, 21, 22, 28, 29, 31, 34, 37, 43, 48, 52, 57, 57, 58, 62, 64, 64, 81, 85, 86, 90, 92, 99...

GATE 2022 - AIR - 3, 9, 13, 17, 21, 24, 26, 32, 35, 36, 38, 40, 43, 46, 49, 53, 55, 55, 57, 60, 62, 71, 74, 77, 78, 83, 84, 91, 93, 109, 126, 140, 153, 166, 172, 181 and many more...
- 29 students in top 100
- 191 students qualified

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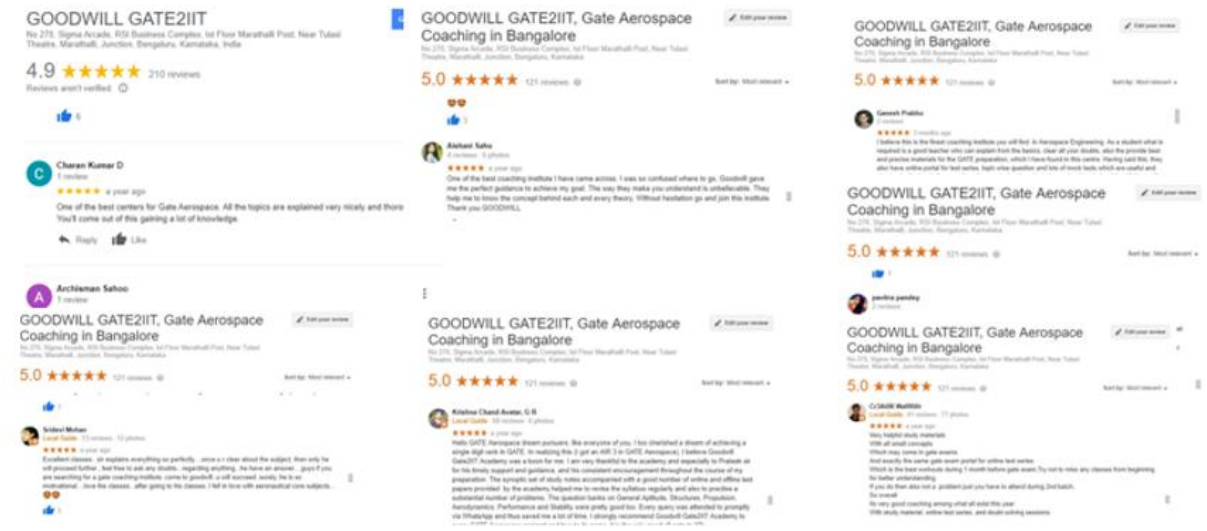
What our Students say



Contact us

+91 9933949303

goodwillgate2iit@gmail.com

www.goodwillgate2iit.com

1st floor , Sigma Arcade, Above Levis showroom, Near Brand Factory, Marathahalli Junction, Bangalore - 560037

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