GATE Syllabus

All Engineering Branches

EC | EE | CE | ME | CS

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GATE Syllabus

GATE syllabus is an essential part of the preparation for the upcoming exam and will carry all the topics on which the exam paper will be based. A deeper and clearer understanding of the GATE syllabus 2023 will help candidates plan their preparation strategy effectively. There are 29 disciplines where the syllabus is considered an important step to prepare.

We have provided a complete list of all disciplines and their GATE syllabus pdf for candidates to download and prepare effectively. We have also provided a brief description of the branch-wise GATE syllabus 2023 to have a quick idea about the important topics that are required to be focused on priority.

Topic-wise GATE Syllabus

The topic-wise breakdown of the GATE syllabus is an important aspect of effective exam preparation. Knowing the topics covered in the exam's respective syllabus will help candidates allot their time according to the importance of the topic. Below we have shared the subject-wise list of all the topics covered in the syllabus.

GATE CSE Syllabus 2023

There are various topics in the Computer Science Engineering syllabus, such as tuple calculus, Lexical analysis, SQL, etc. Check out all the important topics of the GATE CSE syllabus below.

- Engineering Mathematics
- Digital Logic
- Computer Organization and Architecture
- Programming and Data Structures
- Algorithms Theory of Computation
- Compiler Design Operating System
- Databases Computer Networks

GATE Syllabus For Civil Engineering

There are various important topics in the Civil Engineering syllabus for GATE, like Solid Mechanics, Foundation Engineering, Soil Mechanics, etc. Check out all sections in the GATE Civil Engineering syllabus provided below:

- Engineering Mathematics
- Structural Engineering
- Geotechnical Engineering
- Water Resources Engineering
- Environmental Engineering
- Transportation Engineering
- Geomatics Engineering

GATE Syllabus For Mechanical Engineering

Mechanics of Materials, Theory of Machines, and Vibrations are some essential parts of the GATE Syllabus for Mechanical Engineering. Check out the important topics covered in the ME Syllabus:

- Engineering Mathematics
- Applied Mechanics and Design
- Material, Manufacturing, and Industrial Engineering
- Fluid Mechanics and Thermal Science

GATE Syllabus For Electrical Engineering

Topics like Coulomb's Law, DC machines, Bode plots, etc are some important topics of the **GATE syllabus for Electrical Engineering**. We have listed all the major sections of the EE syllabus below:

GATE Electrical Engineering Syllabus	
Engineering Mathematics	Electrical Circuits
Electromagnetic Fields	Power Electronics
Signals and Systems	Electrical Machines
Power Systems	Electrical and Electronic Measurements
Analog and Digital Electronics	Control Systems

GATE Syllabus 2023 For ECE

The **GATE syllabus for ECE** comprises topics like Diode circuits, P-N junction, Maxwell's equations, etc. This discipline has 8 major topics, and the

weightage of each chapter varies depending upon the exam pattern. Check out all important sections in the GATE ECE syllabus:

GATE Syllabus 2023 for ECE	
Engineering Mathematics	Networks, Signals, and Systems
Electronic Devices	Control System
Electromagnetics	Analog Circuits
Communication	Digital Circuits

GATE Aptitude Syllabus

The **GATE General Aptitude syllabus** has Verbal Aptitude, Quantitative Aptitude, Analytical Aptitude, and Spatial Aptitude as the main sections of the syllabus. General Aptitude is a common subject for all branches. The weightage of the GATE Aptitude syllabus in the GATE exam is 15%.

GATE Syllabus 2023 For Chemical Engineering

The GATE Chemical Engineering syllabus contains various important topics such as Heat Transfer, Chemical Reaction, Mass Transfer, and more. The questions in the exam were directly from the topics covered in the prescribed syllabus. All the important sections in the GATE Chemical Engineering syllabus are provided below:

- Engineering Mathematics
- Process Calculations and Thermodynamics
- Fluid Mechanics and Mechanical Operations
- Heat Transfer
- Mass Transfer
- Chemical Reaction Engineering
- Instrumentation and Process Control
- Plant Design and Economics
- Chemical Technology

GATE Syllabus 2023 For Other Subjects

There are 22 other disciplines in the GATE exam. We have explained the complete GATE syllabus for each in the coming sections. Check out the important topics covered in the GATE syllabus 2023 for the various disciplines:

GATE Syllabus For Biomedical Engineering

In the GATE syllabus for Biomedical Engineering, candidates must prepare topics like v-i relationships of the resistor, Bode plot, Transfer function, MOSFET Characteristics, MUX/DEMUX, and a lot more. Each chapter mentioned in the syllabus is important concerning the upcoming exam.

Check out the important topics covered in the GATE Biomedical Engineering syllabus:

GATE Biomedical Engineering Syllabus	
Engineering Mathematics	Electrical Circuits
Signals and Systems	Analog and Digital Electronics
Measurement and Digital Electronics	Sensors and Bio instrumentations
Medical Imaging System	Biomaterials
Human Anatomy	Physiology Biomechanics

GATE Syllabus 2023 For Aerospace Engineering

Topics like Basic Fluid Mechanics, Airy's stress function, Turbomachinery, etc are essential parts of the GATE syllabus for Aerospace Engineering. Check out the sections covered in the Aerospace Engineering Syllabus:

GATE Aerospace Engineering Syllabus 2023	
Fourier Series	Decoupling of longitudinal and lateral-directional dynamics
Laplace Transforms	In-plane and out-of-plane
Elementary ideas of viscous flows, including boundary layers	Wind Tunnel Testing
Airy's stress function	Numerical methods for linear and nonlinear algebraic equations
Equilibrium and compatibility equations	Numerical integration and differentiation.
Theory of elasticity	Vibration of beams
Aerodynamic forces and moments, stability control derivatives	Measurement and visualization techniques
Euler angle	Orbit transfer
Equations of motion	Longitudinal modes; lateral-directional modes
Dynamic stability	

GATE Syllabus For Agriculture Engineering

The GATE Agriculture Engineering syllabus carries 7 major sections. Engineering Mathematics is the common section and carries 13% of the exam

weightage for this discipline as well. Apart from General Aptitude, the rest of the exam paper will carry questions from Farm Machinery, Farm Power, Soil and Water Conservation Engineering, Irrigation and Drainage Engineering, Agricultural Processing Engineering, and Dairy and Food Engineering sections. These are the important sections of the GATE syllabus for Agriculture Engineering and will further various sub-sections individually.

GATE Syllabus 2023 For Architecture Planning

The GATE Syllabus 2023 for Architecture Planning is divided into Part A and Part B. For the candidates, Part A is mandatory. Part B is further divided into two parts, among which candidates must select one. Here we have mentioned a complete list of the topics covered in the Architecture Planning Syllabus.

- Architecture and Design
- Building Materials, Construction, and Management
- Building and Structures
- Environmental Planning and Design
- Urban Design
- Urban Planning and Housing
- Planning Techniques and Management
- Services, Infrastructure, and Transportation

GATE Biotechnology Syllabus

GATE Syllabus for Biotechnology carries Engineering Mathematics, General Biotechnology, Recombinant DNA Technology, Plant and Animal Biotechnology, and Bioprocess Engineering and Process Biotechnology as the main sections.

GATE Syllabus 2023 For Geology and Geophysics

The GATE syllabus for Geology and Geophysics carries three major sections which are: Common Section, Part A - Geology, and Part B - Geophysics. The Common section of the GATE Geology and Geophysics syllabus has various important topics like Earth and planetary system, Structure and composition of the Earth, minerals, the concept of isostasy, Structure and thickness, crust - composition, and Elements of hydrogeology and much more.

GATE syllabus for Geology and Geophysics

Part A: Geology	**Part B: Geophysics Syllabus**
Geomorphology	Solid-Earth Geophysics

Structural geology	Geodesy
Crystallography and mineralogy	Earthquake Seismology
Geochemistry	Potential and Time-Varying Fields
Igneous petrology	Gravity Methods
Sedimentology	Magnetic Methods
Metamorphic petrology	Electrical Methods
Paleobiology	Electromagnetic Methods
Stratigraphy	Seismic methods
Resource geology	Geophysical signal processing
Global tectonics	Geophysical Well Logging
Applied geology Hydrogeology	Radioactive Methods
Basic principles of remote sensing	Geophysical Inversion

GATE Syllabus For Environmental Science Engineering

The GATE syllabus for Environmental Science Engineering carries various high-weightage topics such as Microbial metabolism, characteristics of diverse groups of microorganisms, Stereoisomerism in biomolecules, Structure, properties, water distribution, and more. We have provided a list of major topics included in the Environmental Science Engineering GATE Syllabus:

- Environmental Management and Sustainable Development
- Environmental Chemistry
- Environmental Microbiology
- Air and Noise Pollution
- Solid and Hazardous Waste Management
- Global and Regional Environmental Issues
- Water Resources and Environmental Hydraulics
- Water Wastewater Treatment and Management

GATE Syllabus 2023 For Instrumentation Engineering

The GATE syllabus for Instrumentation Engineering carries 8 major Topicsopics covered in the GATE IN syllabus, such as Voltage and current sources, Gauss's Law, Kirchoff's laws, etc. Check out the sections covered in the Instrumentation Engineering GATE Syllabus listed below:

- Engineering Mathematics
- Electrical Circuits
- Control Systems
- Measurements
- Sensors and Industrial Instrumentation
- Analog and Digital Electronics
- Signals and Systems

- Communication and Optical Instrumentation

GATE Syllabus 2023 For Mathematics

The GATE syllabus 2023 for Mathematics (MA) comprises topics divided into chapters. The chapter-wise distribution of these topics is as given, and these topics further have subtopics under them. The weightage of different topics in the GATE syllabus for Mathematics varies based on the exam pattern.

GATE Syllabus for Mathematics	
Calculus	Functional Analysis
Numerical Analysis	Linear Algebra
Partial Differential Equations	Topology
Rear Analysis	Algebra
Complex Analysis	Ordinary Differential Equations
Linear Programming	

GATE Syllabus For Ecology and Evolution

The sections covered in the GATE syllabus for Ecology and Evolution are Ecology, Evolution, Mathematics and Quantitative Ecology, and Behavioural Ecology.

GATE Syllabus 2023 For Mining Engineering

MN is the code of Mining Engineering for the GATE exam. The topics covered in the GATE syllabus of this discipline are Engineering Mathematics, Geomechanics and Ground Control, Mine Development Surveying, Mining Methods and Machinery, Surface Environment, Mine Ventilation, Underground Hazards, Mine Economics, Mine Planning, and System Engineering.

GATE Physics Syllabus

Hamilton's formalisms, Poynting vector, Uncertainty principle, etc., are some important topics covered in the GATE syllabus for Physics. A list of all the major sections covered in the PH syllabus is shown below:

- Mathematical Physics
- Nuclear and Particle Physics
- Classical Mechanics
- Electromagnetic Theory
- Atomic and Molecular Physics

- Solid State Physics and Electronics
- Quantum Mechanics
- Thermodynamics and Statistical Physics

GATE Syllabus For Metallurgical Engineering

The GATE 2023 syllabus for Metallurgical Engineering carries 6 major topics, which are further divided into chapters for the students to cover. There are various important topics covered in this subject of the GATE syllabus, such as Laws of thermodynamics, Mass transfer: Diffusion and Fick's laws, mass transfer coefficients, Dimensional analysis, Mineral Processing and Extractive Metallurgy, Physical Metallurgy, and a lot more.

GATE Syllabus 2023 For Production and Industrial Engineering

The GATE syllabus for Production and Industrial Engineering includes Engineering Mathematics, General Engineering, Manufacturing Processes, Quality and Reliability, Industrial Engineering, and Operation Research and Operational Management.

GATE Syllabus For Engineering Sciences (XE)

Engineering Mathematics is the first section of the XE paper and is compulsory for all XE candidates. This section carries the following topics in its GATE syllabus 2023 for XE.

- Linear Algebra
- Calculus
- Vector Calculus
- Ordinary Differential Equations
- Partial Differential Equations
- Complex variables
- Probability and Statistics
- Numerical Methods

The next section of the XE paper is decided by the candidates who have to select any two of the following given sections for the GATE exam.

XE Paper Sections	GATE Syllabus
XE-B (Fluid Mechanism GATE Syllabus)	Flow and Fluid Properties, Differential Analysis, Inviscid flow, Internal flo Kinematics, Integral analysis, Dimensional analysis, Prandtl boundary layer equations

XE-C (GATE Material Sciences Syllabus)	Structure and Imperfections Thermodynamics and Kinetics Properties of Materials Processing of Materials Characterization Techniques Material types Elements of Quantum Mechanics and Mathematics Environmental Degradation
XE-D(Solid Mechanics GATE Syllabus)	Flexural and shear stresses, Uniform torsion Bending moment and shear force in statically determinate beams Transformation of stress Simple stress and strain relationships Simple bending theory Buckling of the column, combined and direct bending stresses
XE-E (Thermodynamics GATE Syllabus)	Basic Concepts Thermodynamics Relations, and Ideal Gas Mixtures Law of Thermodynamics Thermodynamics Cycle
XE-F (Polymer Science and Engineering)	Chemistry of high polymers Polymer processing Polymer blends and composites Polymer Technology Polymer rheology Synthesis and properties Polymer testing Polymer Characterization
XE-G (Food Technology)	Food Chemistry and Nutrition Food Products Technology Food Microbiology, and Food Engineering
XE-H(Atmospheric and Oceanic Sciences GATE Syllabus)	**Atmospheric Sciences GATE Syllabus** Fundamental of Meteorology Atmospheric Thermodynamics Observation Techniques of the Atmospheric Properties Fundamental equations Tropical Meteorology Hydrostatic equilibrium Atmospheric Electricity Cloud Physics Primitive equations of Numerical Weather Prediction Synoptic weather forecasting General Circulation and Climate Modelling **Ocean Science GATE Syllabus**

	Seawater Properties T-S diagrams Coastal processes and Estuary Dynamics Coastal zone management Wind-Driven Circulation Ocean Observations Ocean Tide and Waves and their properties Global conveyor belt circulation Momentum equation, mass conservation, Vorticity Subtropical gyres Current System in the Indian Ocean Ocean and Wave Modeling, Ocean State Forecasting Seawater Marine Pollution Data Assimilation Ocean Turbulence Primary and secondary production

GATE Syllabus 2023 For Humanities Social Science (XH)

Reasoning and Comprehension is the compulsory section of the GATE XH Syllabus. The major chapters covered in the XH-B1 syllabus for GATE are Reading, Comprehension, Expression, Analytical reasoning, and Logical reasoning.

The next section of the XH paper will be any one of the given sections shown in the table below. The GATE syllabus for each topic is provided against each of them.

XH Paper Sections	GATE Syllabus
XH-C1 (Economics GATE Syllabus)	Statistics Econometrics and Mathematical Economics Microeconomics Macroeconomics International Economics Public Economics Development Economics Indian Economy
XH-C2(GATE English Syllabus)	Multi-genre literature in English Literature from India and, extending to some degree, the larger Indian subcontine Literary criticism and theory Research approaches and methodologies History of English literature and English literary studies Critical and cultural intellectual traditions and approaches are widely referred to and used in the discipline of English

XH-C3 (GATE Linguistics Syllabus)	Areal Typology, Universals, Cross-linguistic Features Historical Linguistics Sociolinguistics Methods of analysis Language and Linguistics Levels of Grammar and Grammatical Analysis Applied Linguistics
XH-C4(Philosophy GATE Syllabus)	Classical Indian Philosophy Contemporary Western Philosophy Contemporary Indian Philosophy Classical and Modern Western Philosophy
XH-C5 (Psychology GATE Syllabus)	Perception, Learning, Memory, and Forgetting The biological and evolutionary basis of behaviour Personality Development across the lifespan Applications of Psychology Motivation, Emotion, and Stress and Coping Cognition: Thinking, Intelligence, and Language Research Methods and Statistics Psychometrics Social psychology
XH-C6 (Sociology GATE Syllabus)	Research Methodology and Methods, Indian Society / Sociology of India, Social Movements, and Sociological Concepts, Agrarian Sociology and Rural Transformation, Family, Marriage, and Kinship, Sociological Theory, Sociology of Development.

GATE Syllabus For Life Science (XL)

The compulsory section of the GATE XL syllabus is Chemistry. This section carries Structure and Bonding, Atomic Structure and Periodicity, Chemistry of Biomolecules, s, p and d Block Elements, Chemical Equilibria, Electrochemistry, Reaction Kinetics, Thermodynamics, and Structure-Reactivity Correlations and Organic Reaction Mechanisms.

The next section of the XL paper will be decided by the candidates who have to select any two papers from the given list. The GATE syllabus for each optional paper is provided against them.

XL Paper Sections	GATE Syllabus

XH-Q (Biochemistry GATE Syllabus)	Biochemical Separation Techniques Immune System Organization of life, folding and function, and protein structure. Photosynthesis, Enzyme kinetics include its regulation and inhibition, Metabolism of Nitrogen-containing compounds, Metabolic pathways and their regulation, Vitamins, and Coenzymes. Signal transduction Cell structure and organelles; Biological membranes; Hormones and neurotransmitters DNA replication, transcription, and translation; Biochemical regulation of gene expression; Transport across membranes Recombinant DNA technology and applications.
XL-R (Botany GATE Syllabus)	Plant Anatomy Plant Systematics Physiology and Biochemistry Genetics Morphogenesis & Development Plant Breeding and Genetic Modification Plant Pathology Economic Botany Ecology and Environment
XL-S (Microbiology GATE Syllabus)	Methods in Microbiology Historical Perspective Prokaryotic and Eukaryotic Cells: Structure and Function Microbial Growth Microbial Taxonomy and Diversity Control of Microorganisms Chemotherapy/Antibiotics Microbial Genetics Microbial Metabolism Microbial Diseases and Host-Pathogen Interaction Microbial Ecology
XL-T (Zoology GATE Syllabus)	Genetics Evolution Ecology Animal Behavior Animal world Biochemistry and Molecular Biology Animal Anatomy and Physiology Parasitology and Immunology Development Biology Cell Biology Gene expression in Eukaryotes

XL-U (Food Technology GATE Syllabus)	Food Products Technology Food Engineering Food Chemistry and Nutrition Food Microbiology

Our Success Stories

BYJU'S EXAM PREP | GATE

Our Outstanding GATE Results


Rank 02
Poojasree (EC)


Rank 03
Manoj (EC)


Rank 03
Munish (ME)

100+
Students under AIR-100
2021


Rank 06
Parag (EC)


Rank 07
Vatsal (ME)


Rank 08
Rahul (CE)


Rank 08
Hemant (EE)


Rank 08
Rajat (ME)


Rank 09
Vamsi (EC)


Rank 13
Shashwat (CE)


Rank 15
Praveen (EE)


Rank 15
Ankit (ME)


Rank 20
Khajjayam (CS)


Rank 21
Neelesh (CE)


Rank 46
Ajay (EE)


Rank 52
Digvijay (ME)


Rank 56
Gautam (CE)


Rank 80
Anmol (CS)


Rank 82
Vishal (ME)


Rank 100
Abheet (ME)

Our Success Stories

BYJU'S EXAM PREP | GATE

Our Outstanding GATE Results


Rank 06
Ghanendra (EC)

50+
Students under AIR-100
2020


Rank 09
Avinash (ME)


Rank 09
Himanshu (EE)


Rank 26
Kartikay (CE)


Rank 30
Raja (EC)


Rank 39
Navneet (CS)


Rank 54
Rishi (EE)


Rank 56
Nikhil (ME)


Rank 57
Raviteja (CE)


Rank 64
Sourabh (ME)


Rank 02
Anshul (ME)

30+
Students under AIR-100
2019


Rank 04
Chetan (EC)


Rank 05
Pradeep (EE)


Rank 07
Shreyansh (CE)


Rank 10
Mahesh (ME)


Rank 11
Raja (EE)


Rank 29
Devilal (CE)


Rank 37
Ajay (CE)


Rank 45
Kartavya (CS)


Rank 46
Umang (CE)