

A MODERN GUIDE TO CRACK
GATE 2017 ?

IN THE COMPETITIVE AGE

TECHNO HERALD



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs

TABLE OF CONTENTS

Section	Page No.
1. Introduction of GATE	2
2. Importance of GATE	3
3. Specializations offered through GATE	5
4. Information required for GATE exam	7
5. Branch wise Syllabus & subjects	
a. Mechanical Engineering syllabus	9
b. Civil Engineering syllabus	13
c. Computer science syllabus	16
d. Electronics and Communication Engineering syllabus	19
e. Electrical Engineering syllabus	22
f. Chemical Engineering syllabus	25
g. Instrumentation Engineering	28
6. General Aptitude syllabus(common)	31
7. Eligibility Criteria for GATE 2017	32
8. Cut-off Marks of Previous Years	36
9. Pattern of Question Paper	42
10. GATE 2017 Exam Centers	44

SECTION #1

INTRODUCTION OF GATE

What is GATE?

GATE stands for Graduate Aptitude Test in Engineering. It is a popular entrance exam for admission to post graduate engineering courses. The GATE score of the candidate indicates the relative performance level of the candidate. The GATE score is valid for three years and a candidate can apply with that score in post graduate education programs and various jobs in various PSUs–IOCL, HAL, BARC, PGCIL. Government of India also offers scholarships to GATE qualified candidates.

It is conducted and managed jointly by the Indian Institute of Science (IISc) and seven Indian Institute of Technology (IITs), every year in the month of January/February on behalf of the National Coordination Board GATE, Department of Higher Education, Ministry of Human Resource Development, and Government of India.

Thousands of students from all over India prepare for GATE Exam Every Year. In fact, the candidates who appeared in GATE 2016 is 8, 18,850.

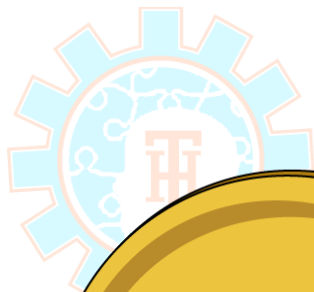
SECTION #2

IMPORTANCE OF GATE

What is the importance of Cracking It?

- M.Tech Degrees offers you specialization in a certain area, and you can pursue Phd after that.
- Scholarship is offered to GATE qualified Students that let you complete your M.Tech almost free of cost.
- You can apply for faculty/research positions in educational institutes/R&D centers.
- Many industries and foreign universities prefer GATE qualified candidates.
- GATE qualified candidates are also eligible for the award of **Junior Research Fellowship** in CSIR laboratories & its sponsored projects.
- Many Public service units like IOC, BPCL, and Power grid are now directly recruiting candidates on GATE score basis.
- Valid GATE score help to get rs.5000 allowances per year as Library Funds for Books/CDs/Notes.

- GATE qualification is also a minimum requirement to apply for various fellowships awarded by many Government organizations like DRDO, BARC, ISRO etc.
- You can pursue MS program at Singapore, Germany & New Zealand.
- You can avail Fellowship at IIMA & IIMB in management course with a monthly stipend of Rs. 22,000
- Higher Salaries are offered for M.Tech/ME candidates comparing to BE/B.Tech candidates.
- Reputed Companies hire M.Tech students through campus recruitments.



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs



SECTION #3

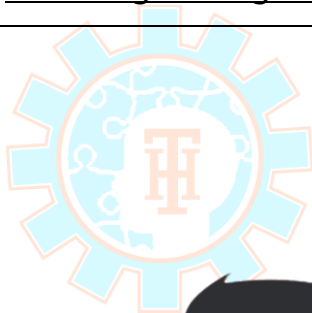
SPECIALIZATIONS OFFERED THROUGH GATE

What are the Specializations offered through GATE EXAM?

The below table depicts you the GATE info in a different specializations field that can be obtainable after passing GATE examination. We have underlined some common engineering stream available for pursuing M.Tech.

<u>Aerospace Engineering</u>	<u>Physics</u>
<u>Agricultural Engineering</u>	<u>Production & Industrial Engineering</u>
<u>Architecture & Planning</u>	<u>Textile Engineering & Fibre Science</u>
<u>Biotechnology</u>	<u>Engineering Mathematics</u>
<u>Civil Engineering</u>	<u>Fluid Mechanics</u>
<u>Chemical Engineering</u>	<u>Material Sciences</u>
<u>Computer Science & Information Technology</u>	<u>Solid Mechanics</u>
<u>Chemistry</u>	<u>Thermodynamics</u>

<u>Electronics & Communication Engineering</u>	<u>Polymer Science & Engineering</u>
<u>Electrical Engineering</u>	<u>Ecology & Evolution</u>
<u>Food Technology</u>	<u>Biochemistry</u>
<u>Instrumentation Engineering</u>	<u>Botany</u>
<u>Mathematics</u>	<u>Microbiology</u>
<u>Mechanical Engineering</u>	<u>Zoology</u>
<u>Mining Engineering</u>	<u>Petroleum Engineering</u>
<u>Metallurgical Engineering</u>	



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs



How to prepare for GATE exam?

All you need to know!



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs

SECTION #4

INFORMATION REQUIRED FOR GATE EXAM

Requirement of documents and data for (Indian Candidates) 2017

Personal information (name, date of birth, your personal mobile number, parent's name, parent's mobile number, etc.)

1. Address for Communication (including PIN code)
2. Eligibility degree details
3. College address, PIN code of college
4. GATE paper, choice of GATE examination cities
5. Scanned image of your photograph
6. Scanned image of your signature
7. Scanned image of your thumb impression
8. Scanned copy in pdf format of Degree Certificate or mark sheet of previous semester/year (for final year candidates) / Provisional certificate (letter) from the Institute for final year students
9. Scanned copy of Category/PWD Certificate (if applicable) in pdf format
10. ID Proof : Only Passport/PAN Card/Voter ID/Aadhaar UID/College ID/Employee ID card
11. Bank details for application fees.

Requirement of documents and data for (International Candidates) 2017

1. Personal information (name, date of birth, your personal mobile number, parent's name, parent's mobile number, etc.)
2. Address for Communication
3. Eligibility degree details
4. College address
5. GATE paper, choice of GATE examination cities
6. Scanned image of your photograph
7. Scanned image of your signature
8. Scanned image of your thumb impression
9. Scanned copy of Degree Certificate or mark sheet of previous semester/year (for final year candidates) in pdf format
10. ID Proof : Only Passport/Government issued ID/College ID/Employee ID card
11. Bank details for application fees.

SECTION #5

BRANCH WISE SYLLABUS & SUBJECTS

GATE 2017 Syllabus for Mechanical Engineering – ME

1. MECHANICAL ENGINEERING – ME

Engineering Mathematics

Linear Algebra: Matrix Algebra, Systems of linear equations, Eigen values and eigen vectors.

Calculus: Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, Multiple integrals, Fourier series. Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Euler's equations, Initial and boundary value problems, Partial Differential Equations and variable separable method.

Complex variables: Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent' series, Residue theorem, solution integrals.

Probability and Statistics: Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression

analysis.

Numerical Methods: Solutions of non-linear algebraic equations, single and multi-step methods for differential equations. Transform Theory: Fourier transform, Laplace transform, Z-transform.

General Aptitude (GA)

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Applied Mechanics and Design

Engineering Mechanics: Free body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion, including impulse and momentum (linear and angular) and energy formulations; impact.

Strength of Materials: Stress and strain, stress-strain relationship and elastic constants, Mohr's circle for plane stress and plane strain, thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; strain energy methods; thermal stresses.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of slider-crank mechanism; gear trains; flywheels.

Vibrations: Free and forced vibration of single degree of freedom systems; effect of damping; vibration isolation; resonance, critical speeds of shafts.

Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints, shafts, spur gears, rolling and sliding contact bearings, brakes and clutches.

Fluid Mechanics and Thermal Sciences

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy; control–volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; viscous flow of incompressible fluids; boundary layer; elementary turbulent flow; flow through pipes, head losses in pipes, bends etc.

Heat–Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept, electrical analogy, unsteady heat conduction, fins; dimensionless parameters in free and forced convective heat transfer, various correlations for heat transfer in flow over flat plates and through pipes; thermal boundary layer; effect of turbulence; radiative heat transfer, black and grey surfaces, shape factors, network analysis; heat exchanger performance, LMTD and NTU methods.

Thermodynamics: Zeroth, First and Second laws of thermodynamics; thermodynamic system and processes; Carnot cycle. irreversibility and availability; behaviour of ideal and real gases, properties of pure substances, calculation of work and heat in ideal processes; analysis of thermodynamic cycles related to energy conversion.

Applications: Power Engineering: Steam Tables, Rankine, Brayton cycles with regeneration and reheat. I.C. Engines: air–standard Otto, Diesel cycles. Refrigeration and air–conditioning: Vapour refrigeration cycle, heat pumps, gas refrigeration, Reverse Brayton cycle; moist air: psychrometric chart, basic psychrometric processes. Turbomachinery: Pelton–wheel, Francis and Kaplan turbines – impulse and reaction principles, velocity diagrams.

Manufacturing and Industrial Engineering

Engineering Materials: Structure and properties of engineering materials, heat treatment, stress–strain diagrams for engineering materials.

Metal Casting: Design of patterns, moulds and cores; solidification and cooling; riser and gating design, design considerations.

Forming: Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy.

Joining: Physics of welding, brazing and soldering; adhesive bonding; design

considerations in welding.

Machining and Machine Tool Operations: Mechanics of machining, single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, principles of design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Inventory Control: Deterministic and probabilistic models; safety stock inventory control systems.

Operations Research: Linear programming, simplex and duplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

GATE 2017 Syllabus for Civil Engineering – CE

2. COMPUTER SCIENCE AND INFORMATION TECHNOLOGY – CS & IT

Engineering Mathematics

Mathematical Logic: Propositional Logic; First Order Logic.

Probability: Conditional Probability; Mean, Median, Mode and Standard Deviation; Random Variables; Distributions; uniform, normal, exponential, Poisson, Binomial.

Set Theory & Algebra: Sets; Relations; Functions; Groups; Partial Orders; Lattice; Boolean Algebra.

Combinatorics: Permutations; Combinations; Counting; Summation; generating functions; recurrence relations; asymptotics.

Graph Theory: Connectivity; spanning trees; Cut vertices & edges; covering; matching; independent sets; Colouring; Planarity; Isomorphism.

Linear Algebra: Algebra of matrices, determinants, systems of linear equations, Eigen values and Eigen vectors.

Numerical Methods: LU decomposition for systems of linear equations; numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton-Raphson Methods; Numerical integration by trapezoidal and Simpson's rules.

Calculus: Limit, Continuity & differentiability, Mean value Theorems, Theorems of integral calculus, evaluation of definite & improper integrals, Partial derivatives, Total derivatives, maxima & minima.

GENERAL APTITUDE(GA):

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Computer Science and Information Technology

Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).

Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.

Programming and Data Structures: Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps.

Algorithms: Analysis, Asymptotic notation, Notions of space and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes P, NP, NP-hard, NP-complete.

Theory of Computation: Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.

Compiler Design: Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization.

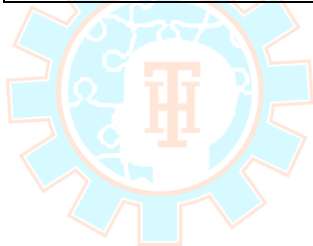
Operating System: Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security.

Databases: ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

Information Systems and Software Engineering: information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

Computer Networks: ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers. Network security basic concepts of public key and private key cryptography, digital signature, firewalls.

Web technologies: HTML, XML, basic concepts of client-server computing.



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs

GATE 2017 Syllabus for Computer Science Engineering – CSE

3. COMPUTER SCIENCE AND INFORMATION TECHNOLOGY – CS & IT

Engineering Mathematics

Mathematical Logic: Propositional Logic; First Order Logic.

Probability: Conditional Probability; Mean, Median, Mode and Standard Deviation; Random Variables; Distributions; uniform, normal, exponential, Poisson, Binomial.

Set Theory & Algebra: Sets; Relations; Functions; Groups; Partial Orders; Lattice; Boolean Algebra.

Combinatorics: Permutations; Combinations; Counting; Summation; generating functions; recurrence relations; asymptotics.

Graph Theory: Connectivity; spanning trees; Cut vertices & edges; covering; matching; independent sets; Colouring; Planarity; Isomorphism.

Linear Algebra: Algebra of matrices, determinants, systems of linear equations, Eigen values and Eigen vectors.

Numerical Methods: LU decomposition for systems of linear equations; numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton-Raphson Methods; Numerical integration by trapezoidal and Simpson's rules.

Calculus: Limit, Continuity & differentiability, Mean value Theorems, Theorems of integral calculus, evaluation of definite & improper integrals, Partial derivatives, Total derivatives, maxima & minima.

GENERAL APTITUDE(GA):

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Computer Science and Information Technology

Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).

Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.

Programming and Data Structures: Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps.

Algorithms: Analysis, Asymptotic notation, Notions of space and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes P, NP, NP-hard, NP-complete.

Theory of Computation: Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.

Compiler Design: Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization.

Operating System: Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security.

Databases: ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures

(sequential files, indexing, B and B+ trees), Transactions and concurrency control.

Information Systems and Software Engineering: information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

Computer Networks: ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers. Network security basic concepts of public key and private key cryptography, digital signature, firewalls.

Web technologies: HTML, XML, basic concepts of client-server computing.



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs

GATE 2017 Syllabus for Electronics and Communication Engineering – ECE

4. ELECTRONICS AND COMMUNICATION ENGINEERING – EC

Engineering Mathematics

Linear Algebra: Matrix Algebra, Systems of linear equations, Eigen values and eigen vectors.

Calculus: Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, Multiple integrals, Fourier series. Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Euler's equations, Initial and boundary value problems, Partial Differential Equations and variable separable method.

Complex variables: Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent' series, Residue theorem, solution integrals.

Probability and Statistics: Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.

Numerical Methods: Solutions of non-linear algebraic equations, single and multi-step methods for differential equations.

Transform Theory: Fourier transform, Laplace transform, Z-transform.

GENERAL APTITUDE(GA):

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Electronics and Communication Engineering

Networks: Network graphs: matrices associated with graphs; incidence, fundamental cut set and fundamental circuit matrices. Solution methods: nodal and mesh analysis. Network theorems: superposition, Thevenin and Norton's maximum power transfer, Wye-Delta transformation. Steady state sinusoidal analysis using phasors. Linear constant coefficient differential equations; time domain analysis of simple RLC circuits, Solution of network equations using Laplace transform: frequency domain analysis of RLC circuits. 2-port network parameters: driving point and transfer functions. State equations for networks.

Electronic Devices: Energy bands in silicon, intrinsic and extrinsic silicon. Carrier transport in silicon: diffusion current, drift current, mobility, and resistivity. Generation and recombination of carriers. p-n junction diode, Zener diode, tunnel diode, BJT, JFET, MOS capacitor, MOSFET, LED, p-i-n and avalanche photo diode, Basics of LASERs. Device technology: integrated circuits fabrication process, oxidation, diffusion, ion implantation, photolithography, n-tub, p-tub and twin-tub CMOS process.

Analog Circuits: Small Signal Equivalent circuits of diodes, BJTs, MOSFETs and analog CMOS. Simple diode circuits, clipping, clamping, rectifier. Biasing and bias stability of transistor and FET amplifiers. Amplifiers: single- and multi-stage, differential and operational, feedback, and power. Frequency response of amplifiers. Simple op-amp circuits. Filters. Sinusoidal oscillators; criterion for oscillation; single-transistor and op-amp configurations. Function generators and wave-shaping circuits, 555 Timers. Power supplies.

Digital circuits: Boolean algebra, minimization of Boolean functions; logic GATES; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs. Sequential circuits: latches and flip-flops, counters and shift-registers. Sample and hold circuits, ADCs, DACs. Semiconductor memories. Microprocessor(8085): architecture, programming, memory and I/O interfacing.

Signals and Systems: Definitions and properties of Laplace transform, continuous-time

and discrete-time Fourier series, continuous-time and discrete-time Fourier Transform, DFT and FFT, z-transform. Sampling theorem. Linear Time-Invariant (LTI) Systems: definitions and properties; causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay. Signal transmission through LTI systems.

Control Systems: Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems. Signal flow graphs and their use in determining transfer functions of systems; transient and steady state analysis of LTI control systems and frequency response. Tools and techniques for LTI control system analysis: root loci, Routh-Hurwitz criterion, Bode and Nyquist plots. Control system compensators: elements of lead and lag compensation, elements of Proportional-Integral-Derivative (PID) control. State variable representation and solution of state equation of LTI control systems.

Communications: Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions. Fundamentals of information theory and channel capacity theorem. Digital communication systems: pulse code modulation (PCM), differential pulse code modulation (DPCM), digital modulation schemes: amplitude, phase and frequency shift keying schemes (ASK, PSK, FSK), matched filter receivers, bandwidth consideration and probability of error calculations for these schemes. Basics of TDMA, FDMA and CDMA and GSM.

Electromagnetics: Elements of vector calculus: divergence and curl; Gauss' and Stokes' theorems, Maxwell's equations: differential and integral forms. Wave equation, Poynting vector. Plane waves: propagation through various media; reflection and refraction; phase and group velocity; skin depth. Transmission lines: characteristic impedance; impedance transformation; Smith chart; impedance matching; S parameters, pulse excitation. Waveguides: modes in rectangular waveguides; boundary conditions; cut-off frequencies; dispersion relations. Basics of propagation in dielectric waveguide and optical fibers. Basics of Antennas: Dipole antennas; radiation pattern; antenna gain.

GATE 2017 Syllabus for Electrical Engineering – EE

5. ELECTRICAL ENGINEERING – EE

Engineering Mathematics

Linear Algebra: Matrix Algebra, Systems of linear equations, Eigen values and eigen vectors.

Calculus: Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, Multiple integrals, Fourier series. Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Euler's equations, Initial and boundary value problems, Partial Differential Equations and variable separable method.

Complex variables: Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent' series, Residue theorem, solution integrals.

Probability and Statistics: Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.

Numerical Methods: Solutions of non-linear algebraic equations, single and multi-step methods for differential equations.

Transform Theory: Fourier transform, Laplace transform, Z-transform.

GENERAL APTITUDE (GA):

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Electrical Engineering

Electric Circuits and Fields: Network graph, KCL, KVL, node and mesh analysis, transient response of dc and ac networks; sinusoidal steady-state analysis, resonance, basic filter concepts; ideal current and voltage sources, Thevenin's, Norton's and Superposition and Maximum Power Transfer theorems, two-port networks, three phase circuits; Gauss Theorem, electric field and potential due to point, line, plane and spherical charge distributions; Ampere's and Biot-Savart's laws; inductance; dielectrics; capacitance.

Signals and Systems: Representation of continuous and discrete-time signals; shifting and scaling operations; linear, time-invariant and causal systems; Fourier series representation of continuous periodic signals; sampling theorem; Fourier, Laplace and Z transforms.

Electrical Machines: Single phase transformer – equivalent circuit, phasor diagram, tests, regulation and efficiency; three phase transformers – connections, parallel operation; auto-transformer; energy conversion principles; DC machines – types, windings, generator characteristics, armature reaction and commutation, starting and speed control of motors; three phase induction motors – principles, types, performance characteristics, starting and speed control; single phase induction motors; synchronous machines – performance, regulation and parallel operation of generators, motor starting, characteristics and applications; servo and stepper motors.

Power Systems: Basic power generation concepts; transmission line models and performance; cable performance, insulation; corona and radio interference; distribution systems; per-unit quantities; bus impedance and admittance matrices; load flow; voltage control; power factor correction; economic operation; symmetrical components; fault analysis; principles of over-current, differential and distance protection; solid state relays and digital protection; circuit breakers; system stability concepts, swing curves and equal area criterion; HVDC transmission and FACTS concepts.

Control Systems: Principles of feedback; transfer function; block diagrams; steady-state errors; Routh and Nyquist techniques; Bode plots; root loci; lag, lead and lead-lag compensation; state space model; state transition matrix, controllability and observability.

Electrical and Electronic Measurements: Bridges and potentiometers; PMMC, moving iron, dynamometer and induction type instruments; measurement of voltage, current, power, energy and power factor; instrument transformers; digital voltmeters and multimeters; phase, time and frequency measurement; Q-meters; oscilloscopes; potentiometric recorders; error analysis.

Analog and Digital Electronics: Characteristics of diodes, BJT, FET; amplifiers – biasing, equivalent circuit and frequency response; oscillators and feedback amplifiers; operational amplifiers – characteristics and applications; simple active filters; VCOs and timers; combinational and sequential logic circuits; multiplexer; Schmitt trigger; multi-vibrators; sample and hold circuits; A/D and D/A converters; 8-bit microprocessor basics, architecture, programming and interfacing.

Power Electronics and Drives: Semiconductor power diodes, transistors, thyristors, triacs, GTOs, MOSFETs and IGBTs – static characteristics and principles of operation; triggering circuits; phase control rectifiers; bridge converters – fully controlled and half controlled; principles of choppers and inverters; basis concepts of adjustable speed dc and ac drives.



Techno Engineers Institute
India's Best Institute for GATE, IES & PSUs

GATE 2017 Syllabus for Chemical Engineering – CH

6. SYLLABUS FOR CHEMICAL ENGINEERING (CH)

Engineering Mathematics

Linear Algebra: Matrix algebra, Systems of linear equations, Eigen values and eigenvectors.

Calculus: Functions of single variable, Limit, continuity and differentiability, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Cauchy's and Euler's equations, Initial and boundary value problems, Laplace transforms, Solutions of one dimensional heat and wave equations and Laplace equation.

Complex variables: Analytic functions, Cauchy's integral theorem, Taylor and Laurent series, Residue theorem.

Probability and Statistics: Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Poisson, Normal and Binomial distributions.

Numerical Methods: Numerical solutions of linear and non-linear algebraic equations
Integration by trapezoidal and Simpson's rule,
single and multi-step methods for differential equations.

Chemical Engineering

Process Calculations and Thermodynamics: Laws of conservation of mass and energy; use of tie components; recycle, bypass and purge calculations; degree of freedom analysis. First and Second laws of thermodynamics. First law application to close and open systems. Second law and Entropy Thermodynamic properties of pure substances: equation of state and departure function, properties of mixtures: partial molar properties, fugacity, excess properties and activity coefficients; phase equilibria: predicting VLE of systems; chemical reaction equilibria.

Fluid Mechanics and Mechanical Operations: Fluid statics, Newtonian and non-Newtonian fluids, Bernoulli equation, Macroscopic friction factors, energy balance, dimensional analysis, shell balances, flow through pipeline systems, flow meters, pumps and compressors, packed and fluidized beds, elementary boundary layer theory, size reduction and size separation; free and hindered settling; centrifuge and cyclones; thickening and classification, filtration, mixing and agitation; conveying of solids.

Heat Transfer: Conduction, convection and radiation, heat transfer coefficients, steady and unsteady heat conduction, boiling, condensation and evaporation; types of heat exchangers and evaporators and their design.

Mass Transfer: Fick's laws, molecular diffusion in fluids, mass transfer coefficients, film, penetration and surface renewal theories; momentum, heat and mass transfer analogies; stagewise and continuous contacting and stage efficiencies; HTU & NTU concepts design and operation of equipment for distillation, absorption, leaching, liquid-liquid extraction, drying, humidification, dehumidification and adsorption.

Chemical Reaction Engineering: Theories of reaction rates; kinetics of homogeneous reactions, interpretation of kinetic data, single and multiple reactions in ideal reactors, non-ideal reactors; residence time distribution, single parameter model; non-isothermal reactors; kinetics of heterogeneous catalytic reactions; diffusion effects in catalysis.

Instrumentation and Process Control: Measurement of process variables; sensors, transducers and their dynamics, transfer functions and dynamic responses of simple systems, process reaction curve, controller modes (P, PI, and PID); control valves; analysis of closed loop systems including stability, frequency response and controller tuning, cascade, feed forward control.

Plant Design and Economics: Process design and sizing of chemical engineering equipment such as compressors, heat exchangers, multistage contactors; principles of process economics and cost estimation including total annualized cost, cost indexes, rate of return, payback period, discounted cash flow, optimization in design.

Chemical Technology: Inorganic chemical industries; sulfuric acid, NaOH, fertilizers (Ammonia, Urea, SSP and TSP); natural products industries (Pulp and Paper, Sugar, Oil, and Fats); petroleum refining and petrochemicals; polymerization industries; polyethylene, polypropylene, PVC and polyester synthetic fibers.



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs

GATE 2017 Syllabus for Instrumentation Engineering – IN

7. INSTRUMENTATION ENGINEERING – IN

Engineering Mathematics

Linear Algebra: Matrix Algebra, Systems of linear equations, Eigen values and eigen vectors.

Calculus: Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, Multiple integrals, Fourier series. Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Euler's equations, Initial and boundary value problems, Partial Differential Equations and variable separable method.

Complex variables: Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent' series, Residue theorem, solution integrals.

Probability and Statistics: Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.

Numerical Methods: Solutions of non-linear algebraic equations, single and multi-step methods for differential equations.

Transform Theory: Fourier transform, Laplace transform, Z-transform.

GENERAL APTITUDE(GA):

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Instrumentation Engineering

Basics of Circuits and Measurement Systems: Kirchoff's laws, mesh and nodal Analysis. Circuit theorems. One-port and two-port Network Functions. Static and dynamic characteristics of Measurement Systems. Error and uncertainty analysis. Statistical analysis of data and curve fitting.

Transducers, Mechanical Measurement and Industrial Instrumentation: Resistive, Capacitive, Inductive and piezoelectric transducers and their signal conditioning. Measurement of displacement, velocity and acceleration (translational and rotational), force, torque, vibration and shock. Measurement of pressure, flow, temperature and liquid level. Measurement of pH, conductivity, viscosity and humidity.

Analog Electronics: Characteristics of diode, BJT, JFET and MOSFET. Diode circuits. Transistors at low and high frequencies, Amplifiers, single and multi-stage. Feedback amplifiers. Operational amplifiers, characteristics and circuit configurations. Instrumentation amplifier. Precision rectifier. V-to-I and I-to-V converter. Op-Amp based active filters. Oscillators and signal generators.

Digital Electronics: Combinational logic circuits, minimization of Boolean functions. IC families, TTL, MOS and CMOS. Arithmetic circuits. Comparators, Schmitt trigger, timers and mono-stable multi-vibrator. Sequential circuits, flip-flops, counters, shift registers. Multiplexer, S/H circuit. Analog-to-Digital and Digital-to-Analog converters. Basics of number system. Microprocessor applications, memory and input-output interfacing. Microcontrollers.

Signals, Systems and Communications: Periodic and aperiodic signals. Impulse response, transfer function and frequency response of first- and second order systems. Convolution, correlation and characteristics of linear time invariant systems. Discrete time system, impulse and frequency response. Pulse transfer function. IIR and FIR filters. Amplitude and frequency modulation and demodulation. Sampling theorem, pulse code modulation. Frequency and time division multiplexing. Amplitude shift keying, frequency shift keying and pulse shift keying for digital modulation.

Electrical and Electronic Measurements: Bridges and potentiometers, measurement of R,L and C. Measurements of voltage, current, power, power factor and energy. A.C & D.C current probes. Extension of instrument ranges. Q-meter and waveform analyzer. Digital voltmeter and multi-meter. Time, phase and frequency measurements. Cathode ray oscilloscope. Serial and parallel communication. Shielding and grounding.

Control Systems and Process Control: Feedback principles. Signal flow graphs. Transient Response, steady-state-errors. Routh and Nyquist criteria. Bode plot, root loci. Time delay systems. Phase and gain margin. State space representation of systems. Mechanical, hydraulic and pneumatic system components. Synchro pair, servo and step motors. On-off, cascade, P, P-I, P-I-D, feed forward and derivative controller, Fuzzy controllers.

Analytical, Optical and Biomedical Instrumentation: Mass spectrometry. UV, visible and IR spectrometry. X-ray and nuclear radiation measurements. Optical sources and detectors, LED, laser, Photo-diode, photo-resistor and their characteristics. Interferometers, applications in metrology. Basics of fiber optics. Biomedical instruments, EEG, ECG and EMG. Clinical measurements. Ultrasonic transducers and Ultrasonography. Principles of Computer Assisted Tomography.



SECTION #6

GATE 2017 SYLLABUS FOR GENERAL APTITUDE – GA

General Aptitude is important section for the GATE exam as the weight-age of this subject is **15 marks**. It is easiest section having **good weightage** in the GATE exam and it can help you to crack the **GATE Exam**.

General aptitude section can be scored easily in GATE Exam and it is divided into two portions: **Verbal Ability and Numerical Ability**. Verbal ability questions can be answered quickly compared to the numerical ability questions.

Numerical Ability questions are easier than verbal but may consume time if you do not apply short-cuts in computations. It is easier to score **10 marks** out of **15 marks** with minimal effort in General aptitude.

GENERAL APTITUDE – GA

(Common to all papers)

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Numerical Ability: Numerical computation, numerical estimation, numerical reasoning and data interpretation.

SECTION #7

ELIGIBILITY CRITERIA FOR GATE 2017 (NO AGE LIMIT)

Qualifying Degree Qualifying Degree/Examination (Descriptive) Degree Status Year of qualification not later than–

- B.E./ B.Tech./ B.Pharm.

Bachelor's degree in Engineering/ Technology (4 years after 10+2 or 3 years after B.Sc./Diploma in Engineering/ Technology) and those who are in the final year of such programs currently in the final year or already completed 2017

- B. Arch.

Bachelor's degree in Architecture (Five years course) currently in the final year or already completed 2017

- B.Sc. (Research)/ B.S.

Bachelor's degree in Science (Post-Diploma/ 4 years after 10+2) Currently in the 4th year or already completed 2017.

- **M. Sc./ M.A./MCA or equivalent**

Master's degree in any branch of Science/Mathematics / Statistics/Computer Applications or equivalent currently in the final year or already completed 2017

- **M.E/ M.Tech (Post-B.Sc.)**

Post-BSc Integrated Master's degree programs in Engineering / Technology (Four year program) currently in the 2nd/3rd/4th year or already completed 2019

- **M.E./ M.Tech or Dual Degree (after Diploma or 10+2)**

Integrated Master's degree program or Dual Degree program in Engineering / Technology (Five year program) currently in the 4th/5th year or already completed 2018



TECHNO HERALD
India's Best Institute for GATE, IES & PSUs

- **M.Sc/ Int. B.S.–M.S.**

Integrated M.Sc. or Five year integrated B. S./M. S. program Currently in the final year or already completed 2017

- **Professional Society Examination (equivalent to B.E./B.Tech./B.Arch.)**

B.E./B.Tech./B.Arch. equivalent examinations of Professional Societies, recognized by MHRD/UPSC/AICTE (e.g., AMIE by Institution of Engineers–India, AMICE by the Institute of Civil Engineers–India).

Candidates from Bangladesh, Ethiopia, Nepal, Singapore, Sri Lanka and United Arab Emirates must have completed or are in the final year of their Bachelor's degree in Engineering/Technology or Post-graduate (M.Sc.) degree in any relevant science subject.

Note: -

Eligibility criteria certificate as applicable shall only be uploaded in application and NOT to be sent by post. If a candidate is pursuing any higher degree or already obtained a degree higher than that mentioned in the above table, then the candidate can select the minimum required qualifying degree while filling the application form. In case, a candidate has completed one of the qualifying examinations as mentioned above in 2016 or earlier, he/she has to submit the degree certificate/provisional degree certificate/course completion certificate/membership certificate issued by the society or institute. In case, the candidate is expected to complete one of the qualifying criteria in 2017 or later as mentioned above, he/she has to submit Provisional Certificate Letter (as shown below) or a copy of marks card for section A of AMIE etc. Candidates with backlog (arrears/failed subjects) in any of the papers in their qualifying degree should upload a copy of any of the mark sheet of the final year issued from the Institute where studying. Internet downloaded mark sheet shall not be accepted.

PROVISIONAL CERTIFICATE LETTER

This is to certify that Mr./Ms. _____
S/O or D/O _____ is studying in
the final year for the degree of _____.

Signature of Candidate with Date:

Signature of the Institute Head/Dean/Registrar/Head of Department with
Date and Seal:



SECTION #8

CUT-OFF MARKS OF PREVIOUS YEARS

CUT-OFF MARKS OF PREVIOUS YEARS ARE BELOW: -

GATE 2010 Cut-off Marks for all Branches

CATEGORY/BRANCH	Computer Science/IT	Civil	Electronics	Electrical	Mechanical
GENERAL	25.00	25.00	25.00	25.25	25.00
S.C./ S.T./PH	16.70	16.70	16.70	16.70	16.70
OBC	22.45	22.70	22.50	22.70	22.50

GATE 2011 Cut-off Marks for all Branches

GATE-2011 CUTOFF MARKS BRANCH & CATEGORY WISE

BRANCH	GENERAL	SC/ST/PD	OBC(Non-creamy)	APPERARED
ELECTRICAL ENGG.	26.08	17.39	23.47	72680
ELECTRONICS & COMM	26.11	17.41	23.50	137853
COMPUTER SC & IT	25.00	16.67	22.50	136027
MECHANICAL ENGG.	30.81	20.54	27.73	81175
CIVIL ENGG.	25.00	16.67	22.50	29347
INSTRUMENTATION	25.00	16.67	22.50	18456
CHEMICAL ENGG.	26.90	17.93	24.21	12994

GATE 2012-13 Cut-off Marks for all Branches

GATE-2012-13 CUTOFF MARKS BRANCH & CATEGORY WISE

BRANCH	GENERAL	SC/ST/PD	OBC(Non-Creamy)	Total Appeared
Computer Sc. & IT	31.54	21.03	28.39	1,56,780
Chemical Engineering	29.38	19.59	26.44	11,407
Civil Engineering	33.03	22.02	29.73	36,156
Electronics & Communication	25	16.67	22.5	1,76,944
Electrical Engineering	25	16.67	22.5	1,10,125
Instrumentation Engineering	25	16.67	22.5	21,509
Mechanical Engineering	27.14	18.09	24.42	1,12,320

GATE 2013-14 Cut-off Marks for all Branches

GATE-2013-14 CUTOFF MARKS BRANCH & CATEGORY WISE

BRANCH	GENERAL	SC/ST/PD	OBC(Non-Creamy)	Total Appeared
Computer Sc. & IT	25.0	16.67	22.25	2,24,160
Chemical Engineering	32.35	21.57	29.12	14,835
Civil Engineering	27.13	18.09	24.42	67,472
Electronics & Communication	25.0	16.67	22.5	2,56,135
Electrical Engineering	25.74	17.16	23.17	1,52,381
Instrumentation Engineering	25.0	16.67	22.25	28,249
Mechanical Engineering	25.0	16.67	22.5	1,65,814

GATE 2014-15 Cut-off / Qualifying Marks Branches Wise				
BRANCH	GENERAL	SC/ST/PD	OBC(Non-Creamy)	Total Appeared
Computer Sc. & IT	25.00	16.67	22.50	155190
Chemical Engineering	35.14	23.43	31.62	15844
Civil Engineering	26.57	17.71	23.91	90872
Electronics & Communication	26.57	17.71	23.01	216367
Electrical Engineering	25.00	16.67	22.50	141799
Instrumentation Engineering	25.00	16.67	22.50	22367
Mechanical Engineering	28.86	19.24	25.97	185578

GATE 2015-16 Cut-off Marks for all Branches

GATE 2015-16 Cut-off Marks for all Branches				
BRANCH	GENERAL	SC/ST/PD	OBC(Non-Creamy)	Total Appeared
Computer Sc. & IT	25.00	16.67	22.50	115425
Chemical Engineering	27.52	18.34	24.77	15874
Civil Engineering	25.00	16.67	22.50	101429
Electronics & Communication	25.00	16.67	22.50	172714
Electrical Engineering	25.00	16.67	22.50	125851
Instrumentation Engineering	25.45	16.96	22.90	22367
Mechanical Engineering	32.73	21.82	29.46	185758

SECTION #9

PATTERN OF QUESTION PAPER

A list of all the 22 papers of GATE with their paper code is listed below:

- Aerospace Engineering: AE
- Agricultural Engineering: AG
- Architecture and Planning: AR
- Biotechnology: BT
- Civil Engineering: CE
- Chemical Engineering: CH
- Computer Science and Information Technology: CS
- Chemistry: CY
- Electronics and Communication Engineering: EC
- Electrical Engineering: EE
- Ecology and Evolution: EY
- Geology and Geophysics: GG
- Instrumentation Engineering: IN
- Mathematics: MA
- Mechanical Engineering: ME
- Mining Engineering: MN
- Metallurgical Engineering: MT
- Physics: PH
- Production and Industrial Engineering: PI
- Textile Engineering and Fiber Science: TF
- Engineering Sciences: XE
- Life Sciences: XL

General Aptitude (GA)	Engineering Mathematics	Technical Questions(subject of your paper code)	Total Marks
15 marks (10 questions)	15 marks	70 marks	100 marks (65 questions)



TECHNO HERALD

& PSUs



SECTION #10

GATE 2017 EXAMINATION CENTRE

GATE 2017 Exam Centers are as follows:

Zone	GATE 2017 Zonal Centre	GATE 2017 Exam Cities
1	IISc Bangalore	Ananthapur, Bagalkot, Bengaluru, Bellary, Belgaum, Bidar, Davengere, Gulbarga, Hassan, Hubli, Hyderabad, Kannur, Kasargod, Kolar, Kozhikode, Kurnool, Malappuram, Mangalore, Manipal, Mysore, Palakkad, Payyannur, Port Blair, Shimoga, Thrissur, Tumkur and Vadakara
2	IIT Bombay	Ahmedabad, Ahmednagar, Amravati, Anand, Aurangabad, Bhavnagar, Bhuj, Gandhinagar, Goa, Jalgaon, Kolhapur, Mehsana, Mumbai, Nagpur, Nanded, Nashik, Navi Mumbai, Pune, Rajkot, Ratnagiri, Sangli, Satara, Solapur, Surat, Thane and Vadodara
3	IIT Delhi	Ajmer, Alwar, Bahadurgarh, Bikaner, New Delhi, Faridabad, Greater NOIDA, Gurgaon, Hisar, Indore, Jammu, Jaipur, Jodhpur, Karnal, Kota, Mathura, Palwal, Rohtak, Sikar, Udaipur and Ujjain
4	IIT Guwahati	Agartala, Asansol, Dhanbad, Durgapur, Gangtok, Guwahati, Imphal, Jorhat, Kalyani, Patna, Silchar, Siliguri, Shillong and Tezpur

5	IIT Kanpur	Agra, Aligarh, Allahabad, Bareilly, Bhopal, Gwalior, Jabalpur, Kanpur, Lucknow and Varanasi
6	IIT Kharagpur	Balasore, Berhampur (Odisha), Bhilai, Bhimavaram, Bhubaneswar, Bilaspur (CG), Cuttack, Eluru, Hooghly, Jamshedpur, Kakinada, (Surampalem), Kharagpur/ Haldia/ Bishnupur, Kolkata, Raipur, Rajahmundry, Ranchi, Rourkela, Sambalpur, Tadepalligudem, Vijayawada, Visakhapatnam and Vizianagaram
7	IIT Madras	Alappuzha, Aluva, Angamaly, Attingal, Bapatla, Chennai, Chengannur, Chittoor, Coimbatore, Cuddalore, Dindigul, Ernakulam, Erode, Gudur, Guntur, Idukki, Kadapa, Kanjirapally, Kanyakumari, Karimnagar, Karur, Khammam, Kollam, Kothamangalam, Kottayam, Madurai, Muvattupuzha, Nagercoil, Nalgonda, Namakkal, Nedumangad, Nellore, Ongole, Pala, Puducherry (Pondicherry), Punalur, Salem, Thanjavur, Thiruchengode, Thiruvannamalai, Thiruvananthapuram, Tiruchirapalli, Tirunelveli, Tirupati, Tuticorin, Vellore, Villupuram, Virudhunagar and Warangal
8	IIT Roorkee	Ambala, Amritsar, Bathinda, Bhimtal, Dehradun, Ghaziabad, Haldwani, Hamirpur (HP), Jalandhar, Kurukshetra, Ludhiana-Khanna, Meerut, Mohali, Moradabad, Muzaffarnagar, NOIDA, Panipat, Pathankot, Patiala-Sangrur, Roorkee, Shimla-Solan-Baddi Sonapat and Yamunanagar Centres abroad: Abu Dhabi/Dubai (UAE), Addis Ababa (Ethiopia), Colombo (Sri Lanka), Dhaka (Bangladesh), Kathmandu, (Nepal)Singapore



TECHNO HERALD

India's Best Institute for GATE, IES & PSUs

www.technoherald.com

ACHIEVE

SUCCEED

IMAGINE

EXPLORE

DREAM

LEARN

LIVE

INSPIRE

CREATE

GATE | IES | PSUs

Helpline :- 9835115333

**203-A, 2nd Floor, Maharaja Kameshwar
Complex Near Patna Junction Opp. Budha
Smriti Park Fraser Road, Patna**