

Electrical Engineering (EE)

Detailed subject and topic catalogue for Quick Revision, Topic-wise Tests, Combined Practice and 10 Full-Length Mocks.

Source: official GATE 2027 EE syllabus, IIT Madras. Topic descriptions below are concise paraphrases organized for a practice-test database; always cross-check the official PDF.

01 Engineering Mathematics

Linear Algebra

Matrix algebra, linear systems, eigenvalues/eigenvectors

Calculus

Integral/vector calculus, multiple integrals, Fourier series

Differential Equations

ODE, PDE, initial and boundary value problems

Complex Variables

Analytic functions, Cauchy, residues, Laurent series

Probability and Statistics

Random variables, distributions, correlation and regression

02 Electric Circuits

Circuit Elements and Analysis

Independent/dependent sources, RLC, KCL/KVL, node/mesh

Network Theorems

Thevenin, Norton, superposition, maximum power transfer

AC and Transient Circuits

Transient response, resonance, two-port networks, three-phase circuits, power factor

03 Electromagnetic Fields

Electrostatics

Coulomb, Gauss, electric potential, dielectrics, capacitance

Magnetostatics and Induction

Biot-Savart, Ampere, Faraday, Lorentz, magnetic circuits, mutual inductance

04 Signals and Systems

Signal Representation

Continuous/discrete signals, LTI, causality, shifting and scaling

Transforms

Fourier series/transform, Laplace, Z transform, sampling

Periodic Waveforms

RMS and average value

05 Electrical Machines

Transformers

Single/three phase transformers, tests, regulation, efficiency, autotransformer

DC Machines

Characteristics, generation, motors and speed control

Induction Machines

Equivalent circuits, torque-speed, starting, tests and speed control

Synchronous Machines

Generators, regulation, parallel operation, synchronous motors, losses

06 Power Systems

Generation and Transmission

Generation, AC/DC transmission, line models, cables, compensation

Load Flow and Operation

Per unit, Y bus, Gauss-Seidel, Newton-Raphson, dispatch, voltage/frequency control

Faults and Protection

Symmetrical components, faults, relays, circuit breakers

Power System Stability

Stability, equal area criterion

07 Control Systems

System Models

Transfer functions, block diagrams, signal flow graphs, state space

Time and Frequency Response

Transient and steady state, Bode, root locus

Stability and Compensation

Routh, Nyquist, lead/lag, P/PI/PID

08 Electrical and Electronic Measurements

Measurements

Bridges, potentiometers, instrument transformers, voltmeters, oscilloscopes, error analysis

09 Analog and Digital Electronics

Analog Electronics

Diodes, rectifiers, amplifiers, op-amps, filters, oscillators, timers

Digital Electronics

Combinational/sequential circuits, MUX/DEMUX, Schmitt trigger, ADC/DAC

10 Power Electronics

Power Devices

Thyristors, MOSFETs, IGBTs and gating

Converters

Buck/boost/buck-boost, rectifiers, AC-DC converters, harmonics

Inverters

Single/three-phase inverters, PWM

Shared module: General Aptitude (GA)

Verbal aptitude, quantitative aptitude, analytical aptitude and spatial aptitude. GA is common to all GATE papers; use the official GA syllabus for the complete detail.

Official source: https://gate2027.iitm.ac.in/static/doc/GATE2027_Syllabus/EE_GATE2027_Syllabus.pdf

Database recommendation: branch_code > section > topic > subtopic > question type > difficulty > marks > revision note.