GATE EC · SYLLABUS UPDATE GUIDE

GATE 2026 → GATE 2027

Electronics & Communication Engineering

What Changed, What Stayed, and How to Prepare

A section-by-section comparison of the official syllabi,
with a revised preparation strategy for GATE 2027 aspirants

GATE 2026 — Organizing Institute: IIT Guwahati
GATE 2027 — Organizing Institute: IIT Madras

Based on the official EC syllabus documents released by both organizing institutes.

About This Guide

Every year, the new organizing institute for GATE reviews and lightly revises the syllabus for each paper. For **GATE 2027**, the Electronics & Communication Engineering (EC) paper has moved from **IIT Guwahati** to **IIT Madras**, and the syllabus has been refreshed with a handful of additions, reworded topics, and one internal reorganization. Nothing has been dropped wholesale — this is an evolutionary update, not a rewrite.

This ebook walks through the two official syllabi side by side, section by section, flags exactly what is new, what has been reworded, and what has been reorganized, and then translates that into a practical study plan so you spend your prep time on the topics that matter most this year.

> **Quick verdict:** Roughly **90% of the GATE 2027 EC syllabus is unchanged** from 2026. The changes are concentrated in three sections — Engineering Mathematics, Networks/Signals & Systems, and Control Systems — plus small additions in Electronic Devices, Analog Circuits, and Communications. Digital Circuits and Electromagnetics are word-for-word identical.

Contents

1. GATE 2027 at a Glance

100	3 hrs	65	30
Total Marks	Duration (CBT)	Total Questions	Papers Offered

Exam Pattern (unchanged from GATE 2026)

Component	Details
General Aptitude (GA)	15 marks (compulsory for every paper)
Engineering Mathematics + Core EC	85 marks
Question types	MCQ (Multiple Choice), MSQ (Multiple Select), NAT (Numerical Answer Type)
Negative marking	Only on MCQs: −1/3 for 1-mark MCQ, −2/3 for 2-mark MCQ. No negative marking on MSQ or NAT.
Calculator	On-screen virtual scientific calculator only; no physical calculator allowed
Mode	Computer Based Test (CBT), online

> The GATE exam pattern comprises total marks, exam mode, time duration, and marking scheme, with the overall paper carrying 100 marks and negative marking applicable only to MCQ-type questions. No structural change to this pattern is expected for GATE 2027.

Key Dates for GATE 2027

Milestone	Expected Timing
Organizing Institute	IIT Madras
Registration opens	14 August 2026
Registration closes	21 September 2026
Admit card release	First week of January 2027
Exam dates	6, 7, 13, 14, 20 and 21 February 2027
Result declaration	19 March 2027

> **New this cycle:** GATE 2027 introduces a new Robotics & Automation (RA) paper, alongside a revised syllabus and updated XE/XH/XL sections, live facial verification during registration, and DigiLocker integration for documents. None of these affect the EC syllabus content directly, but expect a slightly updated application process and possibly tighter identity verification on exam day.

2. Section 1: Engineering Mathematics

This section carries roughly 13-15% of the paper and sees two real changes for 2027.

REWORDED Differential Equations

Year	Syllabus Text
GATE 2026	First order equations (linear and nonlinear), higher order linear differential equations, Cauchy's and Euler's equations, methods of solution using variation of parameters, complementary function and particular integral, partial differential equations, variable separable method, initial and boundary value problems.
GATE 2027	Linear differential equations, Euler-Cauchy equation, Nonhomogeneous equations, methods of solution using variation of parameters, complementary function and particular integral, partial differential equations, variable separable method, initial and boundary value problems.

What it means: the terminology has been tightened up ("Cauchy's and Euler's equations" is now the more standard "Euler-Cauchy equation"), and "Nonhomogeneous equations" is now named explicitly as its own topic. The underlying content — solving linear ODEs, particular integrals, Euler-Cauchy forms — is the same territory you'd already be studying. Treat this as a clarification, not new material, though it's worth explicitly practicing nonhomogeneous higher-order ODEs with different types of RHS functions (exponential, polynomial, trigonometric, and their products).

NEW Probability and Statistics

Year	Syllabus Text
GATE 2026	Mean, median, mode, standard deviation, combinatorial probability, probability distributions, binomial distribution, Poisson distribution, exponential distribution, normal distribution, joint and conditional probability.
GATE 2027	Same as above, plus: correlation and regression analysis.

What it means: this is a genuine new addition. Make sure your prep covers Karl Pearson's correlation coefficient, rank correlation, and simple linear regression (line of best fit, least-squares estimation) — these weren't explicitly listed before.

> **Prep tip:** Linear Algebra, Calculus, Vector Analysis, and Complex Analysis are untouched. If you already have notes/formula sheets from a 2026-targeted plan, they remain fully valid for those four topics.

3. Section 2: Networks, Signals and Systems

This is the section with the most structural movement, though not the most new content.

REORGANIZED LTI Systems moved out of "Discrete-time Signals"

In GATE 2026, the LTI systems topic (definition, causality, stability, impulse response, convolution, poles/zeroes, frequency response, group delay, phase delay) was listed as part of the *Discrete-time Signals* sub-heading. In GATE 2027, it has been pulled out into its own standalone line, positioned right after the 2-port network parameters and before Continuous-time Signals.

> **Why it matters:** this is a structural clarification only — LTI systems theory applies to both continuous and discrete-time systems, so separating it out is more accurate. No new content here, but don't be thrown if a question bank or coaching material relabels this topic.

EXPANDED Continuous-time Signals: sampling

Year	Syllabus Text
GATE 2026	Fourier series and Fourier transform, sampling theorem and applications.
GATE 2027	Fourier series and Fourier transform, Nyquist sampling theorem, sampling and reconstruction.

What it means: "reconstruction" is now explicitly named — make sure you can derive and explain signal reconstruction from samples (ideal low-pass reconstruction filter, aliasing, Nyquist rate) rather than just stating the sampling theorem.

NEW REMOVED Discrete-time Signals

Year	Syllabus Text
GATE 2026	DTFT, DFT, z-transform, discrete-time processing of continuous-time signals.
GATE 2027	DTFT, DFT, z-transform, FIR and IIR filter design.

What it means: this is the single biggest content change in the whole syllabus. "Discrete-time processing of continuous-time signals" (the A/D-DSP-D/A chain topic) has been removed, and **FIR and IIR filter design** has been added in its place. This is a substantive new area: you'll want to cover window-method FIR design, linear-phase FIR filters, and IIR design via impulse invariance / bilinear transformation, which weren't explicitly examinable before.

> **Action item:** If you were using an older question bank, deliberately add FIR/IIR filter design to your syllabus checklist — it's easy to miss since it's tucked inside a sub-bullet rather than given its own heading.

4. Sections 3 & 4: Electronic Devices and Analog Circuits

NEW Section 3 — Electronic Devices

Year	Syllabus Text
GATE 2026	Energy bands in intrinsic and extrinsic semiconductors, equilibrium carrier concentration, direct and indirect band-gap semiconductors.
GATE 2027	Formation of energy bands in solids, energy bands in intrinsic and extrinsic semiconductors, equilibrium carrier concentration, direct and indirect band-gap semiconductors.

What it means: "Formation of energy bands in solids" is a small conceptual addition — the Kronig-Penney-style qualitative picture of how discrete atomic energy levels broaden into bands as atoms are brought together. Good to review even briefly, since it's foundational and easy to explain in 1-mark conceptual questions.

Year	Syllabus Text
GATE 2026	P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, LED, photo diode and solar cell.
GATE 2027	P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, scaling in MOSFETs, LED, photo diode and solar cell.

What it means: "scaling in MOSFETs" is new and points toward short-channel effects — constant-field/constant-voltage scaling, threshold voltage roll-off, velocity saturation, and related short-channel behavior. This is a natural companion to MOSFET fundamentals you're likely covering anyway.

NEW Section 4 — Analog Circuits: Op-amp Circuits

Year	Syllabus Text
GATE 2026	Amplifiers, summers, differentiators, integrators, active filters, Schmitt triggers and oscillators.
GATE 2027	Amplifiers, summers, differentiators, integrators, active filters, Schmitt trigger and oscillators, dominant-pole (Miller) compensation, phase margin.

What it means: this brings op-amp frequency stability formally into scope. Prepare dominant-pole compensation using Miller capacitance, gain-bandwidth trade-offs, and phase margin/stability criteria for feedback amplifiers — a topic that overlaps nicely with your Control Systems prep on Bode plots.

> **Unchanged:** Diode clipping/clamping/rectifiers, and BJT/MOSFET amplifier biasing, small-signal analysis, current mirrors and differential amplifiers are identical to 2026.

5. Sections 5 & 6: Digital Circuits and Control Systems

NO CHANGE Section 5 — Digital Circuits

Number representations, combinational circuits, sequential circuits, data converters, semiconductor memories, and computer organization are **word-for-word identical** between GATE 2026 and GATE 2027. This is the one full section you can prepare exactly as you would have for last year, with zero adjustment.

CHANGED Section 6 — Control Systems

Year	Syllabus Text
GATE 2026	...Bode and root-locus plots; Lag, lead and lag-lead compensation; State variable model and solution of state equation of LTI systems.
GATE 2027	...Bode and root-locus plots; compensators, PID controller; State variable model and solution of state equation of LTI systems.

What it means: "Lag, lead and lag-lead compensation" has been generalized to the broader term "compensators", and **PID controller** is now explicitly named for the first time. Practically:

- Lag, lead, and lag-lead compensator design (the actual technique) is still fully in scope under the umbrella term "compensators" — don't drop it.
- Add explicit PID controller theory: proportional, integral, and derivative action, their individual effects on rise time/overshoot/steady-state error, and basic tuning intuition (Ziegler-Nichols is a common companion topic, though not named directly).

> **Net effect on Section 6:** everything else — feedback principle, transfer functions, block diagrams, signal flow graphs, transient/steady-state analysis, Routh-Hurwitz, Nyquist criterion, Bode/root-locus plots, and state-variable models — is unchanged. Only the compensation topic gets a genuine addition (PID).

6. Sections 7 & 8: Communications and Electromagnetics

NEW Section 7 — Communications: Information Theory

Year	Syllabus Text
GATE 2026	Entropy, mutual information and channel capacity theorem.
GATE 2027	Entropy, source coding, mutual information and channel capacity theorem.

What it means: "source coding" is now explicit. Review Shannon's source coding theorem, code efficiency and redundancy, and basic variable-length coding concepts (e.g., Huffman-style prefix coding intuition) alongside entropy and channel capacity.

> Everything else in Communications — random processes, analog modulation (AM/FM), digital modulation (ASK/PSK/FSK/QAM), PCM/DPCM, matched filters, MAP/ML detection, Hamming codes and CRC — is unchanged.

NO CHANGE Section 8 — Electromagnetics

Maxwell's equations, plane waves and propagation, transmission lines, Smith chart, waveguides, optical fibers, and antennas are **identical** to GATE 2026. No adjustment needed here either.

> **Big picture after Sections 1-8:** across the entire EC syllabus, only **8 specific lines** changed out of roughly 45 topic lines. Two sections (Digital Circuits, Electromagnetics) didn't change at all, and one change (LTI systems repositioning) is purely organizational with no new content.

7. Master Summary: Every Change At a Glance

Section	Topic	Nature of Change	Action Needed
1. Maths	Differential Equations	Reworded	Practice nonhomogeneous ODEs explicitly
1. Maths	Probability & Statistics	New	Add correlation & regression analysis
2. Signals	LTI Systems	Repositioned	No new content; note the reorg
2. Signals	Continuous-time Signals	Expanded	Cover signal reconstruction explicitly
2. Signals	Discrete-time Signals	Swap	Add FIR/IIR filter design; drop DSP-chain topic
3. Devices	Energy Bands	New	Review band formation qualitatively
3. Devices	MOSFET	New	Add MOSFET scaling / short-channel effects
4. Analog	Op-amp Circuits	New	Add Miller compensation & phase margin
5. Digital	All topics	No change	Prepare as-is
6. Control	Compensation	Changed	Add PID controller theory
7. Comms	Information Theory	New	Add source coding theorem
8. EM	All topics	No change	Prepare as-is

Institute change: GATE 2026 was organized by IIT Guwahati; GATE 2027 is organized by IIT Madras. Organizing-institute changes sometimes bring subtle shifts in question style/difficulty balance based on the new institute's faculty committee, so practicing a broad mix of previous-year papers from multiple past organizers (not just the most recent one) is still good practice.

8. Revised Preparation Strategy

The good news: this is not a syllabus overhaul. If you already had a GATE-EC study plan, it stays roughly 90% valid. Adjust it with the additions below rather than starting over.

Step 1 — Patch your existing notes

- Add a short section on **correlation and regression analysis** to your Probability & Statistics notes.
- Add **FIR and IIR filter design** as a new topic under DSP — this deserves real study time, not just a glance, since filter design questions can carry 2 marks and involve numerical computation.
- Add a short note on **signal reconstruction** under sampling theory.
- Add **MOSFET scaling / short-channel effects** under Electronic Devices.
- Add **Miller compensation and phase margin** under Op-amp circuits — link this mentally to your Bode plot / stability prep in Control Systems.
- Add **PID controller** theory under Control Systems compensation.
- Add **source coding theorem** under Information Theory.

Step 2 — Re-weight your revision time

Since two sections (Digital Circuits, Electromagnetics) are unchanged, they're the safest to revise using any existing high-quality previous-year question sets without modification. Put your *incremental* study hours into the sections that gained new content:

Section	Typical Weightage*	2027 Prep Priority
Engineering Mathematics	~13%	Medium (light patch)
Networks, Signals & Systems	~12%	**High** (filter design is new & substantial)
Electronic Devices	~7-8%	Medium (light patch)
Analog Circuits	~9-10%	Medium (light patch)
Digital Circuits	~9-10%	Low (unchanged, use existing material)
Control Systems	~8-9%	Medium (add PID)
Communications	~12-13%	Medium (light patch)
Electromagnetics	~8-9%	Low (unchanged, use existing material)

*Approximate historical weightage based on past GATE EC papers; actual 2027 distribution will depend on the question paper set by IIT Madras.

Step 3 — Rethink your previous-year-question (PYQ) practice

PYQs remain your single best resource, but be deliberate about the new topics, which won't have GATE-specific PYQs yet since they weren't separately named before:

- **FIR/IIR filter design:** pull problems from a standard DSP textbook (Oppenheim & Schafer, or Proakis & Manolakis) rather than relying only on GATE PYQs.
- **PID controllers:** most control systems textbooks (Nise, Ogata) have dedicated PID chapters with worked numericals — use those to supplement thin GATE-specific PID coverage.
- **Correlation & regression:** practice numerical problems computing Pearson's coefficient and fitting a regression line, since GATE probability numericals are typically computation-heavy.
- **Miller compensation / phase margin:** this connects directly to older GATE questions on op-amp gain-bandwidth product and feedback stability — revisit those with the new compensation lens.

> **Don't over-index on "new" topics.** Even though seven lines changed, the exam's numerical weight is still overwhelmingly on the unchanged fundamentals. Spend most of your hours on core topics (network theorems, semiconductor devices, amplifier analysis, digital logic, modulation schemes, EM wave propagation) and treat the new additions as focused top-ups, not a parallel syllabus.

Step 4 — Build a revision loop, not a one-pass read

1. **First pass (concept building):** go topic by topic through this updated syllabus, one section at a time, solving in-chapter problems as you go.
2. **Second pass (PYQ practice):** solve 10 years of previous GATE EC papers, topic-tagged, timing yourself per question.
3. **Third pass (mock tests):** take full-length mock tests under real exam conditions (3 hours, on-screen calculator only) roughly weekly in the final 2 months.
4. **Fourth pass (error log):** maintain a running log of mistakes by topic and revisit it weekly — this is usually worth more marks than fresh content in the last month.

9. Suggested Study Timeline (Aug 2026 → Feb 2027)

Working backward from the first exam date (6 February 2027), here is a sample 6-month timeline that folds in the syllabus changes.

Period	Focus
Aug - Sep 2026	Engineering Mathematics (incl. correlation/regression) + Electronic Devices (incl. band formation, MOSFET scaling). Register for GATE 2027 within this window.
Oct 2026	Networks & Circuit Analysis + Analog Circuits (incl. Miller compensation, phase margin).
Nov 2026	Signals & Systems, with dedicated time on FIR/IIR filter design and signal reconstruction; begin Digital Circuits (unchanged, can move fast).
Dec 2026	Control Systems (incl. PID) + Communications (incl. source coding) + Electromagnetics.
Early Jan 2027	Complete first full syllabus pass; download admit card; begin daily PYQ practice across all sections.
Mid-Late Jan 2027	Full-length weekly mock tests + error-log review; light revision only, no new topics.
First week of Feb 2027	Formula sheet revision, light problem-solving, rest before exam days (6/7/13/14/20/21 Feb).

Multiple exam dates: since GATE 2027 spans six dates across three weekends (to accommodate the new Robotics & Automation paper alongside the existing 30 papers), double-check your allotted EC exam date and session on your admit card as soon as it's released, and plan your final revision week around that specific date.

Weekly Rhythm During the Study Phase

Day	Activity
Mon-Fri	2-3 hours: new concept study + solved examples in that week's focus section
Saturday	Topic-wise PYQ practice (25-30 questions) from the week's section
Sunday	Revision of the week's notes + update error log; light review of previous weeks

Recommended Resource Mix

Resource Type	Best Used For
Standard textbooks (Sedra-Smith, Oppenheim, Ogata, Sze, Proakis)	Deep conceptual understanding, especially for newly-added topics with limited GATE PYQs
GATE Previous Year Questions (last 10-15 years)	Understanding question style, difficulty calibration, and time management
Standard formula/short-notes sheet	Final-week rapid revision
Full-length mock tests	Exam temperament, time allocation across 65 questions in 3 hours
Error log / mistake notebook	Converting repeated silly mistakes into permanent fixes

How to Treat the "New" Topics Specifically

- **FIR/IIR filter design:** allocate roughly 3-4 focused study sessions; this is conceptually rich enough to generate both 1-mark conceptual and 2-mark numerical questions.
- **PID controller:** 1-2 sessions is usually enough given its overlap with existing compensator/feedback theory you're already covering.
- **Correlation & regression, source coding, MOSFET scaling, band formation, Miller compensation:** each of these is a smaller addition — a single focused session (1.5-2 hours) with a handful of practice problems should be sufficient for each.

> **Perspective check:** across the whole syllabus, these new/changed topics together are unlikely to command more than 4-8 marks out of 100 in a typical paper. Don't let the "what's new" excitement distract from mastering the 85-90% that hasn't changed at all.

10. Final Tips & Pre-Exam Checklist

General Exam-Day Tips

- Attempt questions in two rounds: easy/known questions first, flagged/harder ones on a second pass.
- For NAT questions, always double-check units and decimal precision before submitting.
- Since there's no negative marking on NAT or MSQ, never leave a NAT question blank if you have a reasonable estimate — but be careful with MCQs where negative marking applies.
- Practice using the on-screen virtual calculator well in advance; it behaves differently from a physical calculator.
- Keep 5-10 minutes at the end purely for review, not for attempting new questions.

Syllabus-Change Checklist

✔	Item
☐	Added correlation & regression to Probability/Statistics notes
☐	Studied FIR and IIR filter design (window method, bilinear transform)
☐	Reviewed signal reconstruction alongside the sampling theorem
☐	Reviewed formation of energy bands in solids
☐	Studied MOSFET scaling / short-channel effects
☐	Studied Miller (dominant-pole) compensation & phase margin
☐	Studied PID controller theory
☐	Reviewed source coding theorem under Information Theory
☐	Confirmed Digital Circuits & Electromagnetics need no syllabus adjustment
☐	Registered on the GOAPS portal before the deadline (21 Sep 2026)

> This guide is based on a direct comparison of the official GATE 2026 (IIT Guwahati) and GATE 2027 (IIT Madras) EC syllabus documents, supplemented with publicly available information on the GATE 2027 exam pattern and schedule. Always cross-check final details against the official GATE 2027 Information Brochure at **gate2027.iitm.ac.in** before finalizing your preparation plan.