Best Books for GATE EC (Topic-Wise)

Subjects	GATE Syllabus	Reference Book
Engineering Mathematics	Linear Algebra Calculus Differential Equations Vector Analysis Complex Analysis Numerical Methods Probability and Statistics	Higher Engineering Mathematics – Dr. BS Grewal Engineering Mathematics – Erwin Kreyszig Advance Engineering Mathematics – Dr. HK Dass Advanced Engineering Mathematics by R. K. Jain, S. R. K. Iyengar
General Aptitude	Verbal Ability Numerical Ability	Quantitative Aptitude – R. S. Agarwal Logical Reasoning – R. S. Agarwal Objective English – Hari Mohan Prasad Quantitative Aptitude by CAT by Arun Sharma
Network Theory	Network solution methods: nodal and mesh analysis; Network theorems: superposition, Thevenin and Norton's, maximum power	Network Theory by Alexander Sadiku Circuit Theory by A.

	transfer; Wye-Delta transformation; Steady state sinusoidal analysis using phasors; Time domain analysis of simple linear circuits; Solution of network equations using Laplace transform; Frequency domain analysis of RLC circuits; Linear 2-port network parameters: driving point and transfer functions; State equations for networks.	Chakraborty Network Analysis by Van Valkenburg Engineering Circuit Analysis – Hayt & Kammerly Linear Circuit Analysis - De Carlo/Lin
Electronic Devices	Energy bands in intrinsic and extrinsic silicon; Carrier transport: diffusion current, drift current, mobility and resistivity; Generation and recombination of carriers; Poisson and continuity equations; P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, LED, photodiode and solar cell; Integrated circuit fabrication process: oxidation, diffusion, ion implantation, photolithography and twin-tub CMOS process.	Integrated Electronics:- Jacob Millman & Christos C. Halkias Solid State electronic Devices- Ben Streetman and Sanjay Banerjee Semiconductor devices – David Neamen Semiconductor devices-S. M. Sze DC Analysis of MOS Transistor-Tsivid
Analog Circuits	Small signal equivalent circuits of diodes, BJTs and MOSFETs; Simple diode circuits: clipping, clamping and rectifiers; Single-stage BJT and	Micro Electronics circuit – Sedra & Smith Linear ICs – Gaekwad

	MOSFET amplifiers: biasing, bias stability, mid-frequency small signal analysis and frequency response; BJT and MOSFET amplifiers: multi-stage, differential, feedback, power and operational; Simple op-amp circuits; Active filters; Sinusoidal oscillators: criterion for oscillation; single-transistor and opamp configurations; Function generators, wave-shaping circuits and 555 timers; Voltage reference circuits; Power supplies: ripple removal and regulation	Analog Electronics, Electronics devices and circuits – Donald A Neaman Electronic Devices and Circuit Theory by Robert L Boylestad & Nashelsky Pulse and Digital Electronics by Millman and Taub
Digital Circuits	Number systems; Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders and PLAs; Sequential circuits: latches and flip-flops, counters, shift-registers and finite state machines; Data converters: sample and hold circuits, ADCs and DACs; Semiconductor memories: ROM, SRAM, DRAM; 8-bit microprocessor (8085):	Digital Electronics – Morris Mano Microprocessor Architecture, Programming and Applications with the 8085 – Ramesh Gaonker Digital Electronic Principles and applications by Ronald J. Toccii, Pearson Publications Digital circuits and design by Salivahanan Fundamentals of digital

	architecture, programming, memory and I/O interfacing.	systems by Anandkumar Digital Logic and Computer Design by M.Morris Mano
System & Signal	Continuous-time signals: Fourier series and Fourier transform representations, sampling theorem and applications; Discrete-time signals: discrete-time Fourier transform (DTFT), DFT, FFT, Z-transform, interpolation of discrete-time signals; LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay, digital filter design techniques.	Signals & Systems By Alan V. Oppenheim Modern digital and analog Communications system by BP Lathi Digital Signal Processing by S.K Mitra Signals & System – Oppenheim & Schafer Signals & System – Proakis Signals & System – Schaum Series-H.P. Hsu
Control System	Basic control system components; Feedback principle; Transfer function; Block diagram representation; Signal flow graph; Transient and steady-state analysis of LTI systems; Frequency response; Routh-Hurwitz and Nyquist stability criteria; Bode and root-locus plots; Lag, lead and lag-lead compensation; State variable model and solution of state equation of LTI systems.	Automatic Control Systems – Benjamin C Kuo Modern Control System – Katsuhiko Ogata Control Systems Engineering by Norma Nise Control Systems by Nagarath and Gopal

Communications	Random processes: autocorrelation and power spectral density, properties of white noise, filtering of random signals through LTI systems; Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, superheterodyne receivers, circuits for analog communications; Information theory: entropy, mutual information and channel capacity theorem; Digital communications: PCM, DPCM, digital modulation schemes, amplitude, phase and frequency shift keying (ASK, PSK, FSK), QAM, MAP and ML decoding, matched filter receiver, calculation of bandwidth, SNR and BER for digital modulation; Fundamentals of error correction, Hamming codes; Timing and frequency synchronization, inter-symbol interference and its mitigation; Basics of TDMA, FDMA and CDMA.	Analog and Digital Communication System by Simon Haykin Principle of Communication System by Taub& Schillings Modern digital and analog Communications system by BP Lathi Electronic Communication Systems by Kennedy and Davis (just the Noise chapter)
Electro-Magnetics	Electrostatics; Maxwell's equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting	Elements of Electromagnetics by Matthew N.O. Sadiku

	vector; Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media, skin depth; Transmission lines: equations, characteristic impedance, impedance matching, impedance transformation, S-parameters, Smith chart; Waveguides: modes, boundary conditions, cut-off frequencies, dispersion relations;Antennas: antenna types, radiation pattern, gain and directivity, return loss, antenna arrays; Basics of radar; Light propagation in optical fibers.	Network lines and fields by J.D Ryder (Transmission lines part) Electromagnetic waves and Radiating Systems by Jordon and Balmain Antenna Theory by Balanis NPTEL Lectures by Prof. R. Shevgaonkar Engineering Electromagnetics-William Hayt Schaum's Outline of Electromagnetics -Joseph A Edminister Antenna And Wave Propagation-KD Prasad
MCQ books	-	Gate ECE by R.K Kanodia