Keywords and suggested reading for entrance exams for Master's Course, Quantum Matter Program (Electronic Engineering Field), Graduate School of Advanced Science and Engineering (April 2026 Admission)

1. Electromagnetism
   - Basic laws of electricity and magnetism
   - Electrostatic fields, conductors, dielectrics, steady currents, magnetostatic fields, magnetic materials, dc circuits, ac circuits, electromagnetic waves
   - D. J. Griffiths, *Introduction to Electrodynamics*, 4th edition, Cambridge University Press, 2013, chapters 1 through 9
   - P. G. Huray, *Maxwell's Equations*, Wiley, 2010
2. Electric Circuits
   - Basics of electric circuits
   - dc circuits, ac circuits, network analysis, Fourier transform, 2-port networks, transient responses, distributed circuits
   - C. K. Alexander and M. N. O. Sadiku, *Fundamentals of Electric Circuits*, 2nd edition, McGraw-Hill, 2003
   - R. Collier, *Transmission Lines*, Cambridge University Press, 2013
3. Semiconductor Engineering
   - Fundamentals of semiconductor materials and devices
   - Crystal structures, reciprocal lattice, Bloch's theorem, energy bands, carrier statistics, diffusion of electrons and holes, carrier generation-recombination, electric conduction, Hall effect, p-n junctions, metal-semiconductor junctions, metal-insulator-semiconductor structures
   - S. M. Sze and M.-K. Lee, *Semiconductor Devices: Physics and Technology*, 3rd edition, Wiley, chapters 2, 3, 4, and 6
   - S. M. Sze and K. K. Ng, *Physics of Semiconductor Devices*, 3rd edition, Wiley, 2007, chapters 2, 3, 4, and 6
4. Quantum Mechanics
   - Basic understanding of quantum mechanics
   - Eigenvalue problems and scattering problems
   - Wave functions and probability density, physical observables and operators, eigenvalues and expectation values, eigenvalue problems (square-well potential, periodic boundary condition, harmonic oscillator), one-dimensional scattering problem, superposition principle, uncertainty
   - A. T. Fromhold, Jr., *Quantum Mechanics for Applied Physics and Engineering*,

Dover, 1991

- L. I. Schiff, *Quantum Mechanics*, 3rd edition, McGraw-Hill, 1968