PUNJAB PUBLIC SERVICE COMMISSION
COMBINED COMPETITIVE EXAMINATION (CCE) SYLLABUS

PHYSICS

Total Marks: 100

	Topics
1	**Mechanics and Special Relativity** Scalars and vectors; Newton's laws of motion; conservation of energy, linear momentum, and angular momentum; circular and rotational motion; gravitation and satellite motion; Basic concepts of special relativity, Lorentz transformations, time dilation, length contraction and mass–energy equivalence.
2	**Fluid Mechanics, Oscillations, Waves and Optics** Surface tension, viscosity, and Bernoulli's theorem; simple harmonic motion and forced oscillations; travelling and standing waves; Basic wave phenomena, including diffraction and polarization; electromagnetic waves; lasers and their applications.
3	**Heat, Thermodynamics and Statistical Mechanics** Ideal gases and the van der Waals equation; laws of thermodynamics; entropy and basic thermodynamic potentials; kinetic theory of gases and Maxwell's velocity distribution; heat transfer; introductory concepts of Maxwell–Boltzmann, Bose–Einstein, and Fermi–Dirac statistics.
4	**Electricity and Magnetism** Electric field, electric potential, and Gauss's law; capacitance and dielectrics; magnetic fields and Ampère's law; magnetic properties of matter; electromagnetic induction; Alternating-current circuits and resonance; Maxwell's equations and the basic properties of electromagnetic waves.
5	**Electronics and Digital Systems** Semiconductor basics; p-type and n-type semiconductors; p–n junction diodes and rectification; transistors and their basic applications; operational amplifiers and elementary applications; number systems, Boolean algebra and basic logic gates.
6	**Atomic Physics and Quantum Mechanics** Bohr's atomic model; quantum numbers, electron spin, and Pauli's exclusion principle; photoelectric effect and Compton scattering; de Broglie hypothesis and Heisenberg's uncertainty principle; basic Schrödinger wave equation and its applications; Zeeman effect.
7	**Nuclear and Particle Physics** Nuclear structure, mass defect and binding energy; radioactive decay and half-life; alpha, beta, and gamma radiation; detection of nuclear radiation; nuclear reactions, fission and fusion; Basic principles of nuclear reactors; elementary particles and their fundamental properties.
8	**Solid State Physics** Crystal structures and lattice concepts; energy-band theory; conductors, insulators and semiconductors; Basic magnetic properties of solids; superconductivity and its applications.

Suggested readings:

1. University Physics, Vol. 1–3, Jeff Sanny, Samuel Ling, and William Moebs, OpenStax, 2016.
2. Fundamentals of Physics, 12th Edition, David Halliday, Robert Resnick, Jearl Walker, John Wiley & Sons, 2021.
3. Introduction to Electromagnetic Fields and Waves, Dale Corson and Paul Lorrain, Literary Licensing, LLC, 2013.
4. Thermal Physics, Charles Kittel and Herbert Kroemer, Macmillan, 1980.
5. Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis Nashelsky, Pearson, 2011.
6. Concepts of Modern Physics, Arthur Beiser, 2009.
7. Introduction to Solid State Physics, Charles Kittel and Paul McEuen, New York: Wiley, 1976.
8. College Physics 2e, Paul Urone, Roger Hinrichs, Kim Dirks, Manjula Sharma, Kenneth Podolak, and Henry Smith, OpenStax, 2026.
9. Introductory Nuclear Physics, 2nd Edition, Samuel S. M. Wong, Wiley-VCH, 2024.

Note: **The above list is only suggestive and not exhaustive. Candidates may consult other standard books and relevant material covering the prescribed syllabus.**

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