Study Guide for Probability Theory Exam

MATHEMATICAL FOUNDATION OF PROBABILITY IS ASSUMED:
Random variables (r.v.s), expectation and higher moments of r.v.s, Fatou's lemma, monotone and dominated convergence theorems; inequalities of Markov, Chebyshev, Holder, Minkowski, and Jenson.

Convergence; Distribution Functions and Characteristic Functions:
Weak convergence of probability measures, Alexandrov theorem, tightness and weak compactness, Prohorov theorem
Infinitely divisible distribution and Levy-Khintchine representation.
References: [1,3,4,5]

Laws of Large Numbers
Sums of independent r.v.s, Khintchine-Kolmogorov theorem
   Kolmogorov's Three-series and Two-series theorems
   Weak and Strong laws of large numbers
References: [1,2,3,4,5]

Central Limit Theorems
Various central limit theorems and rates of convergence
   Convergence in distribution to infinitely divisible distributions
References: [1,2,3,4,5]

Discrete-time Martingales
Martingales and semimartingales
   Doob's inequalities (including upcrossing inequality)
   Optional sampling and convergence theorems
References: [1,2,4,5]

References