

I- G.Boffetta e A.Vulpiani  
 "Probabilita' in Fisica"  
 (Springer 2012)

II- B.V. Gnedenko  
 "The Theory of Probability"  
 (MIR Publ. 1976)

III- M. Scott  
 "Applied Stochastic Processes"

IV- A.Vulpiani  
 "Exercise for the course Statistical Physics"

BASIC ELEMENTS of PROBABILITY  
 [I Chap.s 1,2,3 + Appendice,  
 or II Chap.s 1,2,4,5,6,7,8]

- \* Bertrand paradox
- \* Necessity of a mathematical approach
- \* Conditional probability
- \* Binomial distribution
- \* Poisson distribution
- \* Law of large numbers
- \* Generating function, characteristic function
- \* Cumulants
- \* Central limit theorem
- \* Large deviations (basic elements)

INTRODUCTION to STOCHASTIC PROCESSES  
 [I Chap.s 4,5,6 + 7.1 and 7.2,  
 or III 1.1, 1.2, 2.1, 2.2, 3.1,3.2,3.3, 6.1,6.2]

- \* The problem of ergodicity (basic elements)
- \* Brownian motion
- \* Langevin equation (discrete time version)
- \* Markov chains
- \* Master equations
- \* Fokker-Planck equation
- \* Langevin equation

In order to pass the exam the student must  
 be able to solve simple exarcises as those  
 in IV.