2011-2012 ICTP POSTGRADUATE DIPLOMA PROGRAMME
EARTH SYSTEM PHYSICS

Mathematical Methods (ESP-MM)
(12 lectures : 18 hrs)

1) Probability basics (discrete and continuous problems)
    a. Probability spaces, events, outcomes
    b. Conditional probabilities
    c. Independent events
    d. Counting: permutations and combinations
    e. Binomial, Poisson, uniform, Gaussian and other distributions of probability
    f. Probability density functions
    g. Mean and variance
    h. Expectation operator
    i. Higher order moments
    j. Autocovariance and autocorrelation functions
    k. Gaussian distributions
2) Joint properties of random data
    a. Joint probability functions
    b. Cross-correlation functions
3) Random data handling
    a. Stationarity
    b. Ergodic processes
    c. Power spectral density functions (Fourier transforms)

Resources:
Recommended Book:
Bendat & Piersol, Random Data: Analysis and Measurement Procedures. (Wiley, 1971)