EK 500: PROBABILITY AND STATISTICAL METHODS

COURSE OUTLINE

1. FOUNDATIONS OF PROBABILITY THEORY.

1.1. Basic concepts (sample space, event space, probability space)

1.2. Probability measures and probability functions

1.3. Discrete and continuous probability spaces

1.4. Dependent and independent events, conditional probability

2. RANDOM VARIABLES.

2.1. Definitions

2.2. Probability distribution and density functions

2.3. Functions of random variables

2.4. Expectation, moments, characteristic functions

2.5. Sequences of random variables, convergence, laws of large numbers and central limit theorem

3. RANDOM PROCESSES.

3.1. Definitions

3.2. Random process properties (stationarity, ergodicity, correlation)

3.3. Spectral analysis, random process transformations

3.4. Special random processes used in modeling:

    Gaussian, Poisson, Markov; applications

3.5. Introduction to Estimation