

01-286 - PROBABILITY

Prerequisites: 01-111, 112, 113, 114, 1126 (or 1140).

Credit: 4 credits

Class Hours: Mondays, Tuesdays, Thursdays and Fridays from 2:00 - 3:00 pm

Office Hour: Tuesdays and Thursdays from 15:00 - 16:00

DESCRIPTION:

1. AXIOMATIC PROBABILITY

Introduction. Fields, sigma-field and measure. Borel algebra. Probability measure. Events.

Probability space. Lebesgue measure. Conditional Probability. Theorem of Total Probability. Baye's Formula. Independent Events.

2. RANDOM VARIABLES

Definitions. Classification of Random Variable. Functions of a Random Variable. Distribution Functions. Density Functions. Properties of Distribution Functions. Joint Density Functions. Functions of More than One Random Variable.

3. MATHEMATICAL EXPECTATION AND MOMENTS

Introduction. Properties of Expectation. Variance. Correlation. Characteristic Functions. Properties of Characteristic Functions. Conditional Expectation. Properties of Conditional Expectation.

4. SPECIAL DISTRIBUTIONS

Sampling Distributions. Sample Mean and Sample Variance. Chi-Square, t, and F Distributions.

5. CONVERGENCE AND LIMIT THEOREMS

Introduction. Convergence Theorems. Markov Inequality. Chebyshev's Inequality and the weak Law of Large Numbers. The Central Limit Theorem. The Strong Law of Large Numbers.

TEXT / REFERENCE BOOKS:

- ASH, R. (1972) "Real Analysis and Probability", Academic Press.
- BRÉMAUD, P. (1980) " An introduction to Probabilistic Modeling ", Springer-Verlag.
- CHUNG, K.L. (1968) "A Course in Probability Theory", Academic Press.
- DURRETT, R. (1999) "Probability: Theory and Examples".
- FELLER, W. (1965) "An introduction to probability theory and its applications", John Wiley.
- PARZEN, E. (1960) "Modern probability", John Wiley.
- ROSS, S. (1998) "A first course in Probability" , Prentice Hall.