Review Course in Maths and Statistics: *Probability & Statistics*

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**PROGRAM**  
*Brush-up Courses 2019-2020 - Master Program in Economics and Master Program in Finance*

**COURSE OUTLINE**

**Part 1: Introduction to probability**
- a. Probability and counting rules
- b. Conditional probability, independence
- c. Bayes theorem
- d. Probability distributions

**Part 2: Random variables**
- a. Discrete random variables
- b. Cumulative distribution function
- c. Expectation of a random variable, variance
- d. Sums and averages of i.i.d random variables
- e. Discrete models
- f. Continuous random variables, probability density
- g. Continuous models: gaussian, chi-squared, t and F distributions
- h. Moments of a random variable, moment generating function
- i. Central limit theorem
- j. Other continuous models

**Part 3: Basics of inference**
- a. Sampling distributions
- b. Point estimation
- c. Confidence intervals
- d. Non parametric tests
- e. Hypothesis testing
- f. Power of a test

**Part 4: Joint distributions**
- a. Joint, marginal and conditional distributions
- b. Conditional moments, iterated expectation
- c. Covariance and correlation
- d. The continuous case
- e. The multivariate normal
- f. Linear combinations of normals

**Part 5: Inference revisited**
- a. Simple regression model, analysis of variance
- b. Properties of estimators
- c. Maximum likelihood estimation

**REFERENCES**  