COURSE NAME	**Review Course in Maths and Statistics:** *Probability & Statistics*
PROFESSOR	**Prof. Christian Brownlees** **Practicals: Ugur Yesilbayraktar**
PROGRAM	*Brush-up Courses 2020-2021 - 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	*Mathematical Statistics and Data Analysis* by John Rice, ISBN 978-0534399429