SHORT COURSES:
FILLING THE GAPS IN YOUR QUANTITATIVE BACKGROUND

There are students coming from different academic experiences that makes difficult to decide “where to start from”, and what is supposed to be the common knowledge of students on fundamental topics such as Mathematics, Probability and Investments/Capital Markets.

In order to make sure that all students do have the necessary quantitative background that is required to successfully attend the Master Program, we offer them two short courses (20 hours each) on the essentials of Mathematics and Probability, and we encourage them to carry out an individual study on Investment and Capital Markets. The two short courses will take place with daily lectures in the period 5-7 and 10-14 September 2018. The exact calendar of the courses will appear at latest at the end of August on the noticeboard "Avvisi e news" in the Master’s website (http://www.masters-finins.unito.it/do/home.pl). More detail on the two short courses and on the individual study are below.

Attendance of the short courses is not strictly compulsory, but it is strongly encouraged. We expect that all students will consider the short courses and the personal study a good opportunity either to refresh their knowledge or to enlarge it, in order to be well equipped for the official lectures on the more advanced topics. Moreover, the essential prerequisites of Mathematics, Probability and Investments/Capital Markets will be formally checked: in each exam session of Mathematics for Finance there will be one specific question related to the content of the short course in Mathematics, in each exam session of Numerical and Statistical Methods for Finance there will be one specific question related to the content of the short course in Probability. Furthermore, in each exam session of Asset Pricing and Portfolio Choice there will be one or two specific questions related to the content of the revision suggested.

Short course on “Essentials of Mathematics”

Functions. Global/local maximum and minimum. Infimum, supremum. Concavity and convexity of functions of one or more variables. Limits of functions of one and more variables. Continuity, derivability and differentiability of functions of one or more variables. Polynomial expansions (Taylor’s and Mc Laurin’s expansions) of functions of one or more variables. Necessary and sufficient conditions for local maxima and minima of differentiable functions of one or more variables. Criteria for concavity and convexity of differentiable functions of one or more variables. Constrained optimization, Lagrange multipliers. Numerical sequences, convergence and divergence criteria. Numerical series and series of functions, uniform convergence, radius of convergence. Riemann integral, integrability of continuous functions, and monotonic functions. Improper integrals. Mean value theorem for integrals. Fundamental theorem of calculus. Computation of indefinite and definite integrals by means of different methods such as: immediate integrals, integrals by parts, integrals by substitution, integrals of rational functions. Riemann-Stieltjes

In each exam session of Mathematics for Finance there will be one specific question related to the content of the short course in Mathematics.

**Short course on “Essentials of Probability”**


In each exam session of Numerical and Statistical Methods for Finance there will be one specific question related to the content of the short course in Probability.

**Individual study on Investment and Capital Markets**

Students are strongly encouraged to study by their own chapters 1--11 and 24 of the following text:


You should be able to answer to the questions reported at the end of each chapter. We suggest to carry out your revision before the two short courses start (beginning of September). Alternatively, you can do it in the months September-December, during the first semester.

The intermediate material covered by the personal study will be quickly reviewed by Professor Giovanna Nicodano during the first two weeks of the course in Asset Pricing and Portfolio Choice. Immediately after this review, you will have the option to take a test on this part of the course, which counts for 1/3 of the total grade. In each exam session of Asset Pricing and Portfolio Choice a third of the exam is devoted to a test on these chapters of Bodie Kane Marcus. The only possibility to split the exam is to take the test during the course.

Any doubt related to this individual study should be addressed to Professor Nicodano, email: giovanna.nicodano@unito.it.