

Module Outline: Business Analytics Finance Project

Code	MIS30090
Title	Business Analytics Finance Project
Credits	5 ECTS
Workload	The main phase of this course comprises a week of lectures and hands-on sessions, including working in the Deloitte® Analytics Lab. Students will work in groups and individually, with lectures, practicals, and guest lectures. Over the following five weeks, during their internship, students will be required to prepare, monitor, and report on the performance of a nominal investment portfolio.
Description	<p>In order to obtain the best outcomes from investment strategies, firms need to make optimal use of business information systems for financial data, analyzing that data to make investment decisions. This course uses cases in financial decision making to frame (a) the role of a cutting-edge information system in the business process; (b) the use of large-scale financial data for decision-making; (c) machine-learning models to inform decision-making.</p> <p>This course is based in the UCD Quinn School of Business, using traditional classrooms, collaborative space, and the Deloitte Analytics Lab, where students will gain hands-on experience in training and use of the Bloomberg® financial information system. They will also watch official Bloomberg training videos leading to an exam and certificate from the Bloomberg Essentials Training Programme. This exam is not available through standard computers: hence the opportunity to gain the certificate is a key advantage of access to the Bloomberg terminals. The certificate is widely recognized and sought after in recruitment in this sector.</p> <p>Student groups use the Bloomberg [TMSG] Trade Idea Messaging System to evaluate investment proposals and monitor their performance in a simulated context.</p> <p>Students will use spreadsheet modelling, the Python programming language, and machine learning libraries to make financial decisions.</p>
Learning Outcomes	<p>On successful completion of this modules, students should be able to:</p> <ul style="list-style-type: none"> • Propose and discuss key technologies and information systems used in the financial services investment industry; • Identify, collect, and critically evaluate relevant financial data from live sources in order to propose good investment recommendations; • Use current financial data, spreadsheet modelling, Python programming and machine learning methods to prepare and analyse investment strategies.

Assessment Strategy	<p>100% continuous assessment. Three assignments:</p> <ol style="list-style-type: none"> 1. Students will use the built-in Bloomberg exam system to gain a Bloomberg Certificate (individual assignment, 10%). 2. Students will gather data from Bloomberg, and use analytics methods to calculate returns and risks for various investments. They will use insights from supervised machine learning methods to choose a nominal portfolio (individual assignment, 40%). 3. Students will input a portfolio to the Bloomberg TMSG trading competition. Students will monitor their portfolios (asset prices, company announcements, overall portfolio performance) during the module. They will investigate hierarchical structure among their assets. Finally, they will produce a short written report and presentation (group assignment, 50%).
Introductory readings	<p>Mantegna, 1998, "Hierarchical structure in financial markets" [https://arxiv.org/pdf/cond-mat/9802256.pdf].</p> <p>Downey, "Think Python", chapters 1-3 [available free from http://greenteapress.com/wp/think-python].</p> <p>James et al, "Introduction to Statistical Learning", section 8.1 Decision Trees [available free from http://www-bcf.usc.edu/~gareth/ISL].</p>
Requirements	<p>Laptop with:</p> <ol style="list-style-type: none"> 1. Any version of Excel or equivalent free software (LibreOffice or Google Sheets); 2. Anaconda (a distribution of the open-source programming language Python), available for free download from continuum.io. <p>Audio headphones needed for watching Bloomberg University videos.</p>
Prerequisites and exclusions	<p>We will assume that students know some probability and statistics and some spreadsheet modelling.</p>

Syllabus

Introduction and admin details.

Bloomberg terminal. Getting data from Bloomberg. Bloomberg University self-study videos and exams. Bloomberg TMSG trading competition.

Introduction to Python.

Introduction to machine learning (supervised learning: classification and unsupervised learning: clustering).

Price-earnings ratio. Returns. Risk. Sharpe ratios.

Portfolio allocation. Correlation. Diversification.

Cluster structure in a market using unsupervised learning.

Classifying stocks into “buy” and “sell” using supervised learning.