

VICTORIA INTERNATIONAL APPLIED FINANCE PROGRAMME  
School of Economics and Finance

**MMAF525 FINANCIAL MODELLING**

Trimester One 2012

**COURSE OUTLINE**

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**Names and Contact Details**

The course coordinator is Joe Cheung. Joe is based in Auckland and therefore the preferred contact is via email in the first instance: [jcheung@xtra.co.nz](mailto:jcheung@xtra.co.nz).

The administrator for this course is Anna Potts, Room RH307.  
Email: [viaf-programme@vuw.ac.nz](mailto:viaf-programme@vuw.ac.nz)  
Phone: 04 4636148

**Trimester Dates**

Monday 5<sup>th</sup> March – Sunday 1<sup>st</sup> July 2012  
(Final Assignment Due: Sunday 1<sup>st</sup> July 2012)

**Withdrawal from Course**

1. Your fees will be refunded if you withdraw from this course on or before Friday 16 March 2012.
2. The standard last date for withdrawal from this course is Friday 18<sup>th</sup> May. After this date, students forced to withdraw by circumstances beyond their control must apply for permission on an '*Application for Associate Dean's Permission to Withdraw Late*' including supporting documentation

The application form is available from either of the Faculty's Student Customer Service Desks.

**Class Times and Room Numbers**

Block 1            9:00am Friday 20<sup>th</sup> April – 12:30pm Sunday, 22<sup>nd</sup> April, 2012  
Block 2            9:00am Friday 15<sup>th</sup> June – 12:30pm Sunday 17<sup>th</sup> June, 2012

Classes will take place in KK216 on the Kelburn Campus. A detailed schedule of each block release will be supplied closer to the April and June sessions.

**Attendance for all sessions of both block releases is compulsory.**

## Course Content

*First Block (Friday 20<sup>th</sup> April – Sunday 22<sup>nd</sup> April): Introduction to VBA with Applications in Basic Models in Finance*

### Materials to be covered

The main objective of this session is to introduce students to VBA programming and modelling skills in Excel. These skills will be applied to build a number of basic models in Finance.

### Excel and VBA skills:

- Advance Excel functions, array operations and interactive charts
- Object oriented programming approach and VBA programming environment
- Variable types and use of VBA variables
- Range object and properties
- Basic VBA language structures
- Arrays and dynamic arrays
- Writing simple user-defined functions
- Use of array functions and writing array functions

### Applications in Finance:

- Financial arithmetic calculations with the use of user-defined functions
- Term structure of interest rate problems such as deriving a zero-coupon yield curve, curve fitting and simple term structure modelling
- Price and return distributions of financial assets
- Simulation
- Value at risk and bootstrapping methods

### Readings

1. Text: John Simon Benninga, Financial Modelling, 3<sup>rd</sup> edition, the MIT Press.

| <i>Textbook chapter(s)</i> | <i>Topic</i>   |
|----------------------------|--|
| 30, 31, 33, 34, 35         | Excel functions, arrays/matrices and other useful features                       |
| 36, 37, 38, 39, 40         | User-defined functions, VBA loop structures, macros and user interaction, arrays |
| 1                          | Financial calculations   |
| 27                         | Modelling the term structure   |
| 18                         | Lognormal distribution and simulations   |
| 15                         | Value at risk and bootstrapping  |

2. Supplementary notes on Excel and VBA (these are distributed along with this course outline).

*Second Block (Friday 15<sup>th</sup> June – Sun 17<sup>th</sup> June): Building More Advanced Models in Finance*

### Materials to be covered

The objective of this session is to extend the VBA modelling skills developed in the first session and apply them to a selection of more advanced Finance topics. These topics include option valuation, portfolio optimisation, alternative approaches in portfolio optimisation, duration, immunisation and default-adjusted expected bond returns.

**B: Readings**

Text: John Simon Benninga, Financial Modelling, 3<sup>rd</sup> edition, the MIT Press.

| <b><i>Textbook chapter(s)</i></b> | <b><i>Topic</i></b>                                |
|-----------------------------------|--|
| 16, 19                            | Option valuation                                   |
| 8, 9, 10.1-10.6, 12               | Portfolio selection                                |
| 13                                | Black-Litterman approach to portfolio optimisation |
| 25, 26                            | Duration and immunisation                          |
| 28                                | Default-adjusted expected bond returns             |

**Course Learning Objectives**

This course is designed to provide students with the knowledge of building financial models in Excel. The goal is to bridge the gap between theory and practice. To achieve this goal, students will learn modelling and basic programming skills in Excel and in VBA. These skills will be applied to build financial models based on materials covered in other courses offered in the VIAF programme. On completion of this course, students should have the skills and tools required to build their own financial models.

**Course Delivery**

The course will be delivered in two block releases. Students are expected to complete all readings, exercises and assignments before each block release. Intensive examples based on a number of financial models covering a number of topics in Finance will be covered in each block release. There will be a compulsory 3-hour test at the end of each block release.

*Pre-requisite Skills*

Prior knowledge in VBA programming is neither required nor assumed. However, students are required to have attained intermediate-level Excel skills before taking this course. It is likely that you have already met this requirement if you are a regular Excel user. However, if you are new to Excel or your Excel skills are at the beginner-level, it is essential that you undertake additional work in Excel before the start of this course.

Note that we will be using Excel 2010. The computer labs at Victoria University only have Excel 2010 installed and therefore you will need to sit the tests in Excel 2010. Even if you are a proficient user of other (especially earlier) Excel versions, it will take you some time to be familiar with Excel 2010. Therefore, it is necessary that you have access to Excel 2010 and use Excel 2010 in completing all the assignments. There are many introductory Excel 2010 books available in bookstores which you might find useful.

*While students are not required to have prior programming experience, this course does involve a substantial amount of reading and writing VBA codes. For some students, this could be a highly time-consuming and frustrating experience. Therefore, before committing to take this course, it is strongly recommended that you consider very carefully whether you really want to and are prepared to invest the time and efforts to learn advanced Excel modelling skills.*

## **Expected Workload**

|                                | <u>Activity type</u> | <u>Number of hours</u> |
|--------------------------------|----------------------|------------------------|
| Outside the two block releases | Readings/studying    | 100 hours              |
|                                | Assignments          | 25 hours               |
|                                | Project              | 25 hours               |
| During the two block releases  | Lectures/tests       | 40 hours               |
|                                | Studying             | 10 hours               |

## **Group Work**

While no formal group work is required in this paper, informal study groups will be encouraged. However, for all the assignments in this paper, you must hand in your own individual work.

## **Readings**

- Simon Benninga, Financial Modelling, 3<sup>rd</sup> edition, the MIT Press.
- Supplementary notes for the first session.
- Introductory books on Excel 2010 (you need to purchase these books yourself if required).

## **Materials and Equipment**

Students need to have access to Excel 2010 in order to study for this course. All assignments, class examples and tests will be based on Excel 2010. The tests will be open-book and you will be asked to answer the test questions in Excel 2010 in the computer lab.

## Assessment Requirements

### *Assessment items*

Assessment items in this course include two assignments, one course project and two tests:

| <b>Assessment Item</b> | <b>Weight</b> | <b>Learning Objectives</b>  |
|------------------------|---------------|---|
| Test 1 (3 hours)       | 30%           | Acquire essential financial modelling skills in Excel and VBA programming |
| Test 2 (3 hours)       | 30%           | Apply financial modelling skills to key areas in Finance                  |
| Assignment 1a          | 3%            | Acquire essential financial modelling skills in VBA programming           |
| Assignment 1b          | 3%            | Acquire essential financial modelling skills in VBA programming           |
| Assignment 2           | 6%            | Apply financial modelling skills to key areas in Finance                  |
| Project                | 28%           | Build a financial model to solve a practical problem                      |
| <i>Total</i>           | <i>100%</i>   |   |

Dates when assessment items are due or take place:

| <b>Assessment Item</b> | <b>Date/Due Date</b> |
|------------------------|----------------------|
| Assignment 1a          | (Thu) 22 Mar 2012    |
| Assignment 1b          | (Thu) 5 April 2012   |
| Test 1 (3 hours)       | (Sun) 22 April 2012  |
| Assignment 2           | (Thu) 31 May 2012    |
| Test 2 (3 hours)       | (Sun) 17 June 2012   |
| Project                | (Sun) 1 July 2012    |

Note: All assessment items must be submitted via Blackboard. (<http://blackboard.vuw.ac.nz/>)

### *Course Project*

A key learning outcome of this course is to ensure students are capable of building an Excel model to solve practical problems in Finance. The course project is therefore an integral part of the assessment process. The 28 percent weight being allocated to the course project is a reflection of its importance.

Please note that the course project is an individual assignment and NOT a group project. You must develop your own Excel model. A jointly developed model will not be accepted.

A financial model will generally consist of a set of inputs, a processing module and a set of outputs (tables, graphs, etc.). It should be designed in such a way that it can readily accommodate a 'what-if' analysis, i.e. the model should allow assessments of how changes in values of inputs can affect the model outputs (values, profits, losses, etc).

It is expected that modelling skills covered in this course will be applied to build the model. You can also develop a financial model to solve a problem or as a project at work. However, in that case, you should not use any commercially sensitive data in the model.

If you would like to get some advance feedback on your ideas about the project, you can choose to hand in a one-page proposal of your project when you submit Assignment 2 (by 31 May), although this is not mandatory.

When you hand in your final project, attach a brief summary which highlights key features in your model to ensure that the efforts you put into the project will be given due considerations.

### **Quality Assurance Note**

Your assessed work may also be used for quality assurance purposes, such as to assess the level of achievement of learning objectives as required for accreditation and audit purposes. The findings may be used to inform changes aimed at improving the quality of FCA programmes. All material used for such processes will be treated as confidential, and the outcome will not affect your grade for the course.

### **Penalties**

Marks for each assignment will be reduced by 5% for every day late. The date of submission to Blackboard shall be taken as the date of delivery. There will be a final cut off date, which is one week after the due date for each assignment, after which no assignment will be accepted.

### **Use of Turnitin**

Student work provided for assessment in this course may be checked for academic integrity by the electronic search engine <http://www.turnitin.com>. Turnitin is an on-line plagiarism prevention tool which compares submitted work with a very large database of existing material. At the discretion of the Head of School, handwritten work may be copy-typed by the School and subject to checking by Turnitin. Turnitin will retain a copy of submitted materials on behalf of the University for detection of future plagiarism, but access to the full text of submissions will not be made available to any other party.

### **Mandatory Course Requirements**

To achieve a pass in this paper, a student must:

1. obtain an average mark of at least 50% over all course assessments; and
2. **obtain an average of 45% or higher in the two tests;** and
3. attend both block releases.

If you have, or become aware of, any health condition that could prevent you attending a VIAF compulsory block release, then you should notify the Programme director immediately ([dawn.lorimer@vuw.ac.nz](mailto:dawn.lorimer@vuw.ac.nz)).

Note that failure to meet mandatory requirements does not prevent a student completing other pieces of assessment, including any final examination. (See section 2 of the Assessment Handbook).

### **Class Representative**

A class representative will be elected in the first class, and that person's name and contact details made available to VUWSA, the Course Coordinator and the class. The class representative provides a communication channel to liaise with the Course Coordinator on behalf of students.

### **Communication of Additional Information**

Additional information including assignment questions, details of the block course schedule, feedback on course assessments, etc will be provided primarily via Blackboard (<http://blackboard.vuw.ac.nz/>) and email. Students are responsible for checking messages in Blackboard on a regular basis and ensuring that the VIAF administrator (email: [viaf-programme@vuw.ac.nz](mailto:viaf-programme@vuw.ac.nz)) has your up-to-date email and postal addresses, as well as ensuring your details are correct on Student Records.

**For the following important information follow the links provided:**

#### **Academic Integrity and Plagiarism**

<http://www.victoria.ac.nz/home/study/plagiarism.aspx>

#### **General University Policies and Statutes**

Find key dates, explanations of grades and other useful information at

[www.victoria.ac.nz/home/study](http://www.victoria.ac.nz/home/study)

Find out about academic progress and restricted enrolment at

<http://www.victoria.ac.nz/home/study/academic-progress.aspx>

The University's statutes and policies are available at [www.victoria.ac.nz/home/about/policy](http://www.victoria.ac.nz/home/about/policy), except qualification statutes, which are available via the Calendar webpage at

<http://www.victoria.ac.nz/home/study/calendar.aspx> (See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at

[www.victoria.ac.nz/home/about\\_victoria/avcademic/default.aspx](http://www.victoria.ac.nz/home/about_victoria/avcademic/default.aspx)

#### **AVC (Academic) Website: information including: Conduct, Academic Grievances, Students with Impairments, Student Support**

[http://www.victoria.ac.nz/home/about\\_victoria/avcademic/Publications.aspx](http://www.victoria.ac.nz/home/about_victoria/avcademic/Publications.aspx)

#### **Faculty of Commerce and Administration Offices**

<http://www.victoria.ac.nz/fca/studenthelp/>

#### **Te Putahi Atawhai**

#### **Maori and Pacific Mentoring Programme**

[http://www.victoria.ac.nz/st\\_services/tpa/index.aspx](http://www.victoria.ac.nz/st_services/tpa/index.aspx)