



School of Economics and Finance

## **MMAF525 FINANCIAL MODELLING**

Trimester 1 2005

### **COURSE OUTLINE**

#### **Contact Details**

The course controller is Joe Cheung. Preferred contact is by email. Email address: [jcheung@xtra.co.nz](mailto:jcheung@xtra.co.nz).

#### **Block Release Times**

9:30am Friday, April 8 – 12:30pm Sunday, April 10, 2005  
and 9:30am Saturday, June 11 – 12:30pm Monday, June 13, 2005.

Attendance for all sessions of both block releases is compulsory.

#### **Course Objectives**

This course is designed to equip students with the technical knowledge of building financial models in Excel. The aim is to bridge the gap between financial theory and practice. To achieve this goal, students will learn basic programming/modelling skills in Excel VBA. These skills will then be applied to develop models based on finance theories that students might have learnt from other VIAF courses.

Modelling skills acquired to develop sample applications in this course will provide participants with the tools and confidence to build their own finance applications.

#### Pre-requisite Skills

It is required that participants have achieved intermediate level Excel skills (without any programming) before taking this course. You would likely meet this requirement if you have been using Excel on a regular basis over a number of years. However, if your Excel skill is at the beginner's level, it is necessary that you make additional preparation before the course starts. There are many Excel books available on the market that can help. For instance, a good reference is:

“How to Do Everything in Microsoft Office Excel 2003” by Guy Hart-Davis, McGraw Hill.

**While it is assumed that you do not have any programming experience, there will be a substantial amount of writing and reading VBA codes in this course. It could be a frustrating and time-consuming experience for some participants. It is strongly recommended that you think carefully whether you really need to invest in advanced Excel modelling skills before you enrol.**

## **Course Content**

### **First session (8 April – 10 April): Introduction to VBA and Applications in Finance**

#### **A: Materials to be covered**

The main objective of this session is to develop basic skills in VBA, and learn how to utilise them in simple Finance applications.

#### **VBA skills:**

- Object oriented programming approach and the VBA programming environment
- Variable Declaration and Variable Types
- Range Objects and Properties
  
- Basic VBA Language Structures
- Arrays and Dynamic Arrays
  
- Passing Arguments in Functions and Subroutines
  
- Writing Simple Functions
- Array Functions and writing array functions
- Improving Presentation with Charts
- Introduction to User-Forms and Event-Handlers

#### **Finance applications:**

- Financial arithmetic calculations (annuities, leasing, etc.) with user-defined functions
- Term structure of interest rate problems, such as deriving a zero-coupon yield curve and simple term structure modelling
- Distributions of financial asset prices and simulation methods
- Value at risk and bootstrapping methods

These exercises/illustrations should also give you a head start on the course project of designing a financial model on an application of your own choice (more details below).

## B: Readings

Text: John Simon Benninga, Financial Modelling, 2<sup>nd</sup> edition, the MIT Press.

<b><i>Textbook chapter(s)</i></b>	<b><i>Topic</i></b>
26, 27, 29 and 30	Excel preliminaries
31, 32, 33	User-defined functions, VBA loop structures, macros and user interaction, arrays
1, 5	Financial calculations and leasing
15, 25	Lognormal distribution and simulations
12	Value at risk and bootstrapping

Supplementary notes on Excel and VBA – please read these notes in conjunction with the above textbook chapters.

## **Second session (11 June – 13 June): Building Advanced Financial Models**

### A: Materials to be covered

The objective of this session is to extend the VBA modelling skills developed in the first session to a selection of Finance problems. These include problems such as option pricing, company/stock valuation models, portfolio optimisation, valuing real options, duration, immunisation and default-adjusted expected bond returns.

### B: Readings

Text: John Simon Benninga, Financial Modelling, 2<sup>nd</sup> edition, the MIT Press.

<b><i>Textbook chapter(s)</i></b>	<b><i>Topic</i></b>
13, 16	Option pricing
2, 3 and 4	Company/stock valuation
7, 8, 9, 11	Portfolio selection
20, 21	Duration and immunisation
23	Default-adjusted expected bond returns

## **Course Project**

The key learning outcome of this course is the ability to build a model to solve a Finance problem. It is difficult to assess such ability based on standard examinations. A course project is an integral and important part of the assessment process, and hence the relatively high weighting (30%) being allocated to it.

Students are expected to select a Finance problem(s) and develop their own Excel model to tackle the problem(s). The model will generally consist of an interface for inputs, a processing module and a set of outputs (tables, graphs, etc.). It is expected that the model developed will utilise materials learnt in this course, such as the use of user-defined functions and VBA subroutines.

A summary (up to two pages) for the project should be handed in together with the second assignment. The summary should include a definition of the Finance problem(s) and a 'blueprint' for the model – a description of the components such as input data required, how the data will be processed and what outputs will be generated. Comments on your project ideas will be provided with the return of your assignment so that you can start working on the project before the second session.

### Readings

Simon Benninga, Financial Modelling, 2<sup>nd</sup> edition, the MIT Press.

The textbook will be supplemented by notes.

### Assessment Requirements

There will be two assignments, one course project and two tests.

The first assignment will consist of 4 sets of VBA exercises/tasks. It is primarily a tool to get you started on learning VBA before the first session. The assignment may require a substantial amount of time to complete, but by design each set of exercises will carry only 1% of the total marks to encourage you to learn the materials yourself without having to worry too much about the marks. **It is important that you finish the assignment on your own and do not collaborate with other participants in doing these sets of exercises.** You need to acquire the basic language skills in this assignment yourself before we can move on to tackle more interesting tasks. Please send in the answers (in four sets) by email prior to the deadlines. A set of VBA notes will accompany these exercises. The VBA notes and the first assignment will be sent to you at the start of the course.

The second assignment will consist of exercises related to the materials in the first and second sessions. This will be handed out in the first session.

The first test will be 2-hour long, and held at the end of the first session in the computer lab. The second test would either be a mini-project that you need to complete during the second session, or similar in format to the first test. The exact format would be dependent on progress and you will be notified prior to the start of the second session. The marks will be allocated as follows:

<b>Exams:</b>	One test at each block release session based on reading assigned for period leading up to the block release and material presented at the block release.	<b>50%</b>
<b>Assignments:</b>	Assignment 1 (4 sets of exercises at 1% each):	<b>4%</b>
	Assignment 2	<b>16%</b>
	Course Project	<b>30%</b>
<b>Total Assessment:</b>		<hr/> <b>100%</b>

The due dates for the assignment and the project are listed below:

Assignment 1 (a)	11 March 2005
Assignment 1 (b)	18 March 2005
Assignment 1 (c)	25 March 2005
Assignment 1 (d)	1 April 2005
Assignment 2 (and project proposal)	16 May 2005
Course project	28 June 2005

Please email each part of Assignment 1 directly to [jcheung@xtra.co.nz](mailto:jcheung@xtra.co.nz) and CC to [Bun.Wong@vuw.ac.nz](mailto:Bun.Wong@vuw.ac.nz) by the due dates.

### **Penalties**

Each of the two major assignments will be marked out of a maximum that diminishes by 5% for every day late, with a weekend counting as one day. The date of submission shall be taken as the date of delivery or the day of postmark, if by post. There will be a final cut off date (normally one week after due date) advised for each assignment, after which no assignment can be accepted.

The major assignments will each carry a specified word limit. If an assignment exceeds the word limit, credit will be given only from the beginning of the assignment up to the word limit. No credit will be given for the portion of work extending beyond the word limit.

### **Mandatory Course Requirements**

Students must attend all sessions of both block release courses. To pass, a student must obtain an average mark of at least 50% over total course assessment.

### **Communication of Additional Information**

Additional information including assignment questions, details of the block course schedule, feedback on course assessments, etc will be provided by email or by post. Students are responsible for ensuring that the VIAF administrator, Bun Wong, has their up to date email and postal addresses.

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

Students should familiarise themselves with the University's policies and statutes, particularly those regarding assessment and course of study requirements, and formal academic grievance procedures.

### **Student Conduct and Staff Conduct**

The Statute on Student Conduct together with the Policy on Staff Conduct ensure that members of the University community are able to work, learn, study and participate in the academic and social aspects of the University's life in an atmosphere of safety and respect. The Statute on Student Conduct contains information on what conduct is prohibited and what steps can be taken if there is a

complaint. For queries about complaint procedures under the Statute on Student Conduct, contact the Facilitator and Disputes Advisor. This Statute is available in the Faculty Student Administration Office or on the website at: [www.vuw.ac.nz/policy/StudentConduct](http://www.vuw.ac.nz/policy/StudentConduct).

The policy on Staff Conduct can be found on the VUW website at: [www.vuw.ac.nz/policy/StaffConduct](http://www.vuw.ac.nz/policy/StaffConduct).

### **Academic Grievances**

If you have any academic problems with your course you should talk to the tutor or lecturer concerned or, if you are not satisfied with the result of that meeting, see the Head of School or the Associate Dean (Students) of your Faculty. Class representatives are available to assist you with this process. If, after trying the above channels, you are still unsatisfied, formal grievance procedures can be invoked. These are set out in the Academic Grievances Policy which is published on the VUW website:

[www.vuw.ac.nz/policy/AcademicGrievances](http://www.vuw.ac.nz/policy/AcademicGrievances).

### **Academic Integrity and Plagiarism**

Academic integrity is about honesty – put simply it means **no cheating**. All members of the University community are responsible for upholding academic integrity, which means staff and students are expected to behave honestly, fairly and with respect for others at all times.

Plagiarism is a form of cheating which undermines academic integrity. Plagiarism is **prohibited** at Victoria.

The University defines plagiarism as follows:

Plagiarism is presenting someone else's work as if it were your own, whether you mean to or not.

*'Someone else's work' means anything that is not your own idea, even if it is presented in your own style. It includes material from books, journals or any other printed source, the work of other students or staff, information from the Internet, software programmes and other electronic material, designs and ideas. It also includes the organization or structuring of any such material.*

#### **Plagiarism is not worth the risk.**

Any enrolled student found guilty of plagiarism will be subject to disciplinary procedures under the Statute on Student Conduct ([www.vuw.ac.nz/policy/studentconduct](http://www.vuw.ac.nz/policy/studentconduct)) and may be penalized severely. Consequences of being found guilty of plagiarism can include:

- an oral or written warning
- suspension from class or university
- cancellation of your mark for an assessment or a fail grade for the course.

*Find out more about plagiarism and how to avoid it, on the University's website at: [www.vuw.ac.nz/home/studying/plagiarism.html](http://www.vuw.ac.nz/home/studying/plagiarism.html).*

### **Students with Disabilities**

The University has a policy of reasonable accommodation of the needs of students with disabilities. The policy aims to give students with disabilities an equal opportunity with all other students to demonstrate their abilities. If you have a disability, impairment or chronic medical condition (temporary, permanent or recurring) that may impact on your ability to participate, learn and/or achieve in lectures and tutorials or in meeting the course requirements, then please contact the Course Coordinator as early in the course as possible. Alternatively you may wish to approach a Student Adviser from Disability Support Services to confidentially discuss your individual needs and the options and support that are available. Disability Support Services are located on Level 1, Robert Stout Building, or phoning 463-6070, email: [disability@vuw.ac.nz](mailto:disability@vuw.ac.nz). The name of your School's Disability Liaison Person can be obtained from the Administrative Assistant or the School Prospectus.

### **Student Support**

Staff at Victoria want students' learning experiences at the University to be positive. If your academic progress is causing you concern, please contact the relevant Course Co-ordinator, or Associate Dean who will either help you directly or put you in contact with someone who can.

The Student Services Group is also available to provide a variety of support and services. Find out more at [www.vuw.ac.nz/st\\_services/](http://www.vuw.ac.nz/st_services/) or email [student-services@vuw.ac.nz](mailto:student-services@vuw.ac.nz).

VUWSA employs two Education Coordinators who deal with academic problems and provide support, advice and advocacy services, as well as organising class representatives and faculty delegates. The Education Office is located on the ground floor, Student Union Building, phone 463 6983 or 463 6984, email [education@vuwsa.org.nz](mailto:education@vuwsa.org.nz).