

PAPER OUTLINE

Paper Title: **Advanced Financial Modelling**

Paper Code: **FINA515-10T (HAM)**

School: **Waikato Management School**

Department: **Finance**

Location: **Main Campus, Hillcrest Road, Hamilton**

Convenor: **Kurt Hess (Dr)**
ph. ext: **4196**
room : **MSB.3.38I**
Office Hours: **Tuesdays 8:45-9:45am during T semester**
Email: **KURTHESS@waikato.ac.nz**

Table of Contents

[Staffing](#)
[Timetable Details](#)
[Purpose Statement](#)
[Learning Outcomes](#)
[Activities](#)
[Topics](#)
[Assessment](#)
[Resources](#)
[Schedule](#)
[Review and Evaluation](#)
[Linkages](#)

STAFF

Tutor:

Kenny Bell (Mr)
Email: **kmb56@waikato.ac.nz**

Administrator:

Leonie Pope (Mrs)
ph. ext: **4045**
room : **MSB.2.15**
Office Hours: **9.00-1.00pm Mon - Thur**
Email: **lpope@waikato.ac.nz**

TIMETABLE DETAILS:

This advanced course in financial modelling is taught in conjunction with FINA415-10T in a computer lab format without traditional lectures. This means Monday and Thursday sessions are FINA415 classes which may be attended by the students of FINA515 to gain basic financial modelling skills and to prepare for the joint pieces of assessments (as discussed below). The Tuesday sessions (morning and afternoon) are fully dedicated to FINA515 topics & support for

the FINA515 assignments.

Note that you will have to sit two tests together with the FINA 415 class in

Week 2 - Thursday, 18 November 2010, 10am - 12noon

Week 6 - Thursday, 16 December 2010, 1pm to 4pm (**3 hours!**)

Lectures

Lecture Time	Room
Mon 10am – 12pm	MSB.0.22
Mon 2pm – 4pm	MSB.0.22
Tue 10am – 12pm	MSB.0.22
Tue 2pm – 4pm	MSB.0.22
Thu 10am – 12pm	MSB.0.22
Thu 2pm – 4pm	MSB.0.22

Group Information

PURPOSE STATEMENT

The purpose of this paper is the practical implementation and application of some advanced models in finance. It is taught in a computer lab format. While the theoretical basis for each model family is briefly reviewed, the emphasis is on honing the numerical modelling and data handling skills. The first part of the paper is devoted to laying the foundations both in terms of programming skills and familiarity with software tools (mainly Excel/VBA, EViews, but also script languages, econometric software if necessary). These are acquired through examples drawn from various areas of finance such as portfolio theory, foreign exchange, financial institutions analysis, valuation of derivative instruments, etc. The second part of the course is dedicated to the presentation of selected models from the following topic areas: market and credit risk, corporate finance, numerical and simulation methods, GARCH volatility modelling. Besides three smaller assignments, students must complete a major modelling project. This includes implementation and description of a financial model drawn from the academic literature or specialised modelling/derivatives books.


LEARNING OUTCOMES

- 1 : Implementation of selected models in the areas of fixed income, credit risk and derivatives using the EXCEL/VBA software tool
- 2 : Become familiar with methods to prepare data for empirical analysis.
- 3 : Get exposure to programming with lower level computer languages for applications in financial models
- 4 : Independent implementation and testing of a model from the subject areas of finance or economics

ASSESSMENT

Internal Assessment/Final Examination 1:0

Internally Assessed Components

Component Details			Submission Details		
Component	Due Date	Weighting	Compulsory	Where	How
 Excel Fitness Test	12/11/2010 at 11:59 pm	0.00%		Online	Web Submit Online Test Other
	18/11/2010				

Test 1 (10am-12pm together with FINA 415 class)	at 12 noon	10.00%		Online	Web Submit
Assignment 1: Company Financial Planning Model	21/11/2010 at 11:59 pm	11.00%		Online	Web Submit
Assignment 3 Monte Carlo Method Option Valuation	5/12/2010 at 11:59 pm	13.00%		Online	Web Submit
Assignment 2: Testing Momentum Strategies	28/11/2010 at 11:59 pm	16.00%		to Lecturer	Web Submit
Project Assignment - Model	15/12/2010 at 11:59 pm	21.00%	✓	to Lecturer	Web Submit
Project Assignment - Report	15/12/2010 at 11:59 pm	9.00%	✓	to Lecturer	Web Submit
Test 2 (3 hours 1-4pm together with FINA 415 class)	16/12/2010 at 4:00 pm	20.00%	✓	Online	Web Submit
Total		100%			
Notes <ul style="list-style-type: none"> • The above Internally assessed components make up 100.00% of the total assessment. • The Final Examination makes up the remaining 0% • You are required to complete the Assessments marked as "Compulsory". YOU MUST do the Compulsory Assessment otherwise you will not pass the Paper. 					

Examination

Examination	Starts	Ends	Weighting	Compulsory	Where	How
Exam	Not Available	Ends:	0%	✓	at Exam	Printed

Assignment Details

Excel Fitness Test (Due Date: Friday, 12 November 2010 at 11:59 pm)

Mandatory on-line test without marks to check your Excel 2007 skills. Do the test in your own time. Minimum pass level: at least 18 correct answers out of 20 questions. You have a maximum of three attempts (maximum attempts set to 10 in test software but we expect you to use 3 only).

If you have completed FINA415 in past years and have achieved a mark of B or higher in this course, you are exempt from taking this test.

Test 1 (10am-12pm together with FINA 415 class) (Due Date: Thursday, 18 November 2010 at 12 noon)

TEST DATE: Thursday, 18 November 2010 / TIME: 10am to 12pm

together with FINA 415 class (FINA515 test 1 may be different from the FINA415 version). You will be advised in which computer lab to sit the test.

This test checks on your skill to

- (1) solve basic time value of money problems using Excel
- (2) understand the fundamental structure and company financial statements and the linkages among them.

(2) also requires a basic knowledge of financial performance ratios.

The test format will be explained in the class and an example test for you to practice will be provided. It is assumed the students of this advanced graduate paper already possess the the necessary skills.

You must pass this test in order to continue with the course. Students who have completed FINA415 in earlier years with excellent results in tests (usually A or higher), need not attend this test.

Assignment 1: Company Financial Planning Model (Due Date: Sunday, 21 November 2010 at 11:59 pm)

In this assignment you can practice the use of some advanced spreadsheet features applied to implementation of a company financial planning model. Requirements in separate document. Students need to submit the model (Excel file) and slides (Powerpoint slides)

Assignment 3 Monte Carlo Method Option Valuation (Due Date: Sunday, 5 December 2010 at 11:59 pm)

Develop user-defined VBA functions applied to Monte Carlo simulation of random stock price paths.

Assignment 2: Testing Momentum Strategies (Due Date: Sunday, 28 November 2010 at 11:59 pm)

VBA spreadsheet automation exercise applied to testing ex-post returns of momentum strategies

Project Assignment - Model (Due Date: Wednesday, 15 December 2010 at 11:59 pm)

This item of assessment is Compulsory.

See requirements in separate document.

Project Assignment - Report (Due Date: Wednesday, 15 December 2010 at 11:59 pm)

This item of assessment is Compulsory.

Requirements in separate document.

Test 2 (3 hours 1-4pm together with FINA 415 class) (Due Date: Thursday, 16 December 2010 at 4:00 pm)

This item of assessment is Compulsory.

TEST DATE:

Thursday, 16 December 2010 / TIME: 1 to 4pm (3 hours!)

together with FINA 415 class (note FINA515 test 2 may be different from FINA415 version). You will be advised in which computer lab to sit the test.

You must pass this mandatory test in order to continue with the course.

Students who have completed FINA415 in earlier years with excellent results in tests (usually A or higher), need not attend this test.

RESOURCES

Required

Recommended

The list of books below is likely to "blow" an average student's budget. None of them is specifically required to follow the lab sessions. It depends on a student's particular interests which modeling book, if any, he/she might want to use as a starting point for his/her project assignment. All of them should be available in the library.

Financial Modeling / Financial Derivatives

Benninga, Simon.(2008). *Financial Modeling*, MIT Press. 3rd edition.

Benninga, Simon.(2006) *Principles of Finance with Excel*. New York: Oxford University Press . ISBN 0195301501

Haug, Espen Gaarder. (2007)*The Complete Guide to Option Pricing Formulas (2nd edition)*. McGraw-Hill .

Hull, J.C. (2006). *Options, futures & other derivatives* (6th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Jackson, Mary. *Staunton Mike. (2001) Advanced modelling in finance using Excel and VBA*, John Wiley & Sons

Löffler, G., & Posch, P. N. (2007). *Credit risk modeling using Excel and VBA*. Hoboken, NJ: Wiley.

Rebonato, R. (1998). *Interest-rate option models : understanding, analysing and using models for exotic interest-rate options*: Wiley, Chichester ; New York.

Sengupta, C. (2004). *Financial modeling : using Excel and VBA*. Hoboken, N.J.: Wiley.

van Deventer, D. R., & Imai, K. (1997). *Financial risk analytics : a term structure model approach for banking, insurance and investment management*. Chicago, Ill: Irwin Professional Publ.

Wilmott, P. (2006). *Paul Wilmott on quantitative finance (2nd edition)*: John Wiley. Volumes 1 -3

Wilmott, P. (2007). *Paul Wilmott introduces quantitative finance (2nd edition)*: John Wiley.

Related subject fields:

Albright, S. C. (2001). *VBA for modelers : developing decision support systems with Microsoft Excel*: Duxbury/Thomson Learning.

Lewis, N. D. C. (2004). *Operational risk with Excel and VBA : applied statistical methods for risk management*. Hoboken, N.J.: John Wiley & Sons.

Winston, W. L. (2007). *Microsoft Office Excel 2007 : data analysis and business modeling*. Redmond, Wash.: Microsoft Press.

Excel/VBA Resources:

Blattner, P. (2001). *Using Microsoft Excel 2002* (Special ed.). Indianapolis, Ind.: Que. (available as ebook from library <http://proquest.safaribooksonline.com/0789725118>)

Birnbaum, D., & ebrary Inc. (2002). *Microsoft Excel VBA programming for the absolute beginner*. Indianapolis, IN: Premier Press. (available as ebook from library <http://site.ebrary.com.ezproxy.waikato.ac.nz/lib/waikato/Doc?id=10066542>)

Hawley, D. E., & Hawley, R. (2007). *Excel hacks* (2nd ed.). Sebastopol. CA: O'Reilly Media.

Jelen, B., & Syrstad, T. (2004). *VBA and macros for Microsoft Excel*. Indianapolis, Ind., London: Que ; Pearson Education. The many example files for this book can be downloaded from the following website: <http://www.mrexcel.com/getcode.html>

Jelen, B., & Syrstad, T. (2008). *VBA and macros for Microsoft Office Excel 2007* (2nd ed.). Indianapolis, Ind.: Que Pub.

Walkenbach, J. (2001). *Excel 2002 power programming with VBA*: M&T Books.

Walkenbach, J. (2007). *Excel 2007 power programming with VBA*. Hoboken, N.J. Chichester: Wiley ;

Numerical recipes:

Press, W. H., Flannery, B. P., Teukolsky, S. A., & Vetterling, W. T. (1992). *Numerical recipes in C: the art of scientific computing*: Cambridge University Press.

Other Resources

The course folder contains an Endnote library containing references to books and articles used in this course. Many are also there in the form of a PDF file.

SCHEDULE

Week 1 beginning 8/11/2010					
Mon: 10am-12am	Mon: 2pm-4pm	Tue: 10am-12am	Tue: 2pm-4pm	Thu: 10am-12am	Thu: 2pm-4pm
Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline	Hour 1/2 : Introduction to course Hand out project assignment and discuss requirements.	Hour 3/4: Introduction to assignment 1 (Company Financial Planning Model) Excel topics in support of assignment 1	Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline
1 - Excel Fitness Test, Due Date: Friday, 12 November 2010 at 11:59 pm					
Week 2 beginning 15/11/2010					
Mon: 10am-12am	Mon: 2pm-4pm	Tue: 10am-12am	Tue: 2pm-4pm	Thu: 10am-12am	Thu: 2pm-4pm
Joint class with FINA415 - see FINA415	Joint class with FINA415 - see FINA415	Hour 1/2: Topics in support of	Hour 3/4: Introduction to assignment 2	Test 1 Joint class with	Joint class with FINA415 - see FINA415

course outline	course outline	completing assignment 1	(Testing Momentum Strategy). Some VBA hints to complete this assignment.	FINA415 - see FINA415 course outline	course outline
----------------	----------------	-------------------------	---	--------------------------------------	----------------

2 - Test 1 (10am-12pm together with FINA 415 class), Due Date: Thursday, 18 November 2010 at 12 noon

3 - Assignment 1: Company Financial Planning Model, Due Date: Sunday, 21 November 2010 at 11:59 pm

Week 3 beginning 22/11/2010

Mon: 10am-12am	Mon: 2pm-4pm	Tue: 10am-12am	Tue: 2pm-4pm	Thu: 10am-12am	Thu: 2pm-4pm
Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline	Hour 1/2: Introduction assignment 3: VBA Functions Show & review illustrative stochastic models - geometric Brownian motion, jump diffusion, interest rates Vasicek/CIR	Hour 3/4: Support on assignment 2	Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline

5 - Assignment 2: Testing Momentum Strategies, Due Date: Sunday, 28 November 2010 at 11:59 pm

Week 4 beginning 29/11/2010

Mon: 10am-12am	Mon: 2pm-4pm	Tue: 10am-12am	Tue: 2pm-4pm	Thu: 10am-12am	Thu: 2pm-4pm
Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline	Hour 1/2: Credit & market risk models	Hour 3/4: Support on assignment 3	Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline

4 - Assignment 3 Monte Carlo Method Option Valuation, Due Date: Sunday, 5 December 2010 at 11:59 pm

Week 5 beginning 6/12/2010

Mon: 10am-12am	Mon: 2pm-4pm	Tue: 10am-12am	Tue: 2pm-4pm	Thu: 10am-12am	Thu: 2pm-4pm
Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline	Hour 1/2: Numerical methods in derivative valuation (lattice, grid)	Hour 3/4: Support on project assignment	Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline

Week 6 beginning 13/12/2010

Mon: 10am–12am	Mon: 2pm–4pm	Tue: 10am–12am	Tue: 2pm–4pm	Thu: 10am–12am	Thu: 2pm–4pm
Joint class with FINA415 - see FINA415 course outline	Joint class with FINA415 - see FINA415 course outline	Final support session on project assignment, course review and feedback time	continued from morning session	Joint class with FINA415 - see FINA415 course outline	Test 2 (1-4pm!) Joint class with FINA415 - see FINA415 course outline
6 - Project Assignment - Model, Due Date: Wednesday, 15 December 2010 at 11:59 pm					
7 - Project Assignment - Report, Due Date: Wednesday, 15 December 2010 at 11:59 pm					
9 - Test 2 (3 hours 1-4pm together with FINA 415 class), Due Date: Thursday, 16 December 2010 at 4:00 pm					

REVIEW AND EVALUATION

There will be an on-line evaluation of course content and the lecturer. Details to be announced.

LINKAGES TO OTHER PAPERS

This is quite a challenging paper for students without 'computer-phobia'. While the undergraduate FINA 415 (Computer Modeling in Finance) is targeted to improving analytical skills for a practical work environment, FINA 515 is more demanding both in terms of quantitative and programming skills. The modelling topics are geared to improving modelling skills in research.

Students who have done FINA 415 before have the benefit of a solid base knowledge of the Excel/VBA analysis tool. This will allow them to tackle more involved project topics, possibly using alternative software packages. Furthermore, the complexity of assignments in FINA 515 goes beyond the level of FINA 415 assignments.

Pre-requisites: FINA311, FINA312, ECON404, or FINA415

Restrictions: FINA518

DEPARTMENTAL POLICY