PAPER OUTLINE

Paper Title: **Computer Modelling in Finance**

Paper Code: **FINA415-09B (HAM)**

School: **Waikato Management School**

Department: **Finance**

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

Convenor: **Kurt Hess (Dr)**
ph. ext: **4196**
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TIMETABLE DETAILS:

This course is in a workshop format with lectures embedded into lab sessions. Simply decide for one of the rooms MSB 0.22 or MSB 0.21. There will be an identical programme offered. Sometimes we quickly gather for short introductions in one of the labs but most teaching presentations will be held in both labs.
The third lab MSB 0.20 is reserved in case of larger than expected enrolments and possibly for tests.

On the first day of the class, there will be a short introduction (30 minutes) to the course in MSB 0.22. In case of a very large class, this will be held in a lecture theatre.

On Wednesdays before tests and before some project submission dates, we intend to offer special drop-in tutorials. They will be held in MSB 0.21, 2-4pm. The labs for following Wednesdays have been reserved: 5 Aug, 9, 16, 30 Sept, 14 Oct 2009.

Lectures

Lecture Time	Room
Tue 9am – 11am	MSB.0.21
Tue 9am – 11am	MSB.0.22
Tue 9am – 11am	MSB.0.20
Fri 11am – 1pm	MSB.0.21
Fri 11am – 1pm	MSB.0.22
Fri 11am – 1pm	MSB.0.20

Group Information

PURPOSE STATEMENT

The objective of this paper is to equip students with financial modelling skills using a computer spreadsheet. These skills include generic skills such as performing sensitivity analyses, running simulations and solving valuation problems in finance. The paper will also introduce students to more advanced programming techniques in financial modelling. This includes defining often used financial functions and performing complex tasks in Visual Basic programming codes.

TOPICS

- Structure of Financial Statements (Review accounting basics to do company financial modeling)
  Learner understands the basic structure of balance sheet, income statement, cash flow statement and how they relate to each other.
- Company Modeling
  Understanding and practical development of pro-forma financial statements.
- Company Value and Credit Analysis
  Gain an appreciation of the wide range of methods used in company financial analysis.
- Company Valuation
  Understanding and practical application of methods used in the valuation of larger corporate entities.
- Applying Time Value of Money Concepts in Excel
  Better understanding of time value of money concepts acquired in previous finance papers. Ability to solve more complex present value problems by means of spreadsheet functions.

- Fixed Income Analytics
  Implementation of basic bond yield calculations in Excel. Interpretion of selected advanced concepts in the term structure of interest modeling.
- Models in Portfolio Theory and Statistics
  Gain an appreciation of portfolio theory by implementing simple portfolio optimization models. In this process, students become familiar with statistical measures (e.g. standard deviation, correlation coefficient) commonly used in many areas of finance.
- Spreadsheet Structuring and Handling
  More efficient use of spreadsheets to solve analytical problems.
- Handling of Financial Data
  Ability to apply Excel/VBA based methods to prepare raw data for further analysis.
- Basic VBA Programing Concepts
  Understanding of how VBA can be used to manipulate Excel spreadsheet objects.
- Interactive Financial Models
  After implementing simple models of their own, the students should appreciate the logic, but also the complexity of interactive financial applications.
- Advanced Financial Functions
  Gain an insight into how VBA programmed functions can be applied in advanced financial models (e.g. derivative valuation)

ASSESSMENT

Internal Assessment/Final Examination 1:0

Internally Assessed Components

Component Details			Submission Details		
Component	Due Date	Weighting	Comp-ulsory	Where	How
Excel Fitness Test (on-line test)	31/07/2009 at 11:00 pm	0.00%		Other	Web Submit
Trial Test	6/08/2009 at 12 noon	0.00%		Online	Web Submit
Test 1 (during regular class time)	7/08/2009 at 1:00 pm	15.00%		Online	Web Submit
Project 1 - Company Valuation Project	17/08/2009 at 11:59 am	17.50%		Online	Web Submit
Project 1 - Presentation slides	18/08/2009 at 11:00 am	0.00%		at Lecture	Printed
Project 2 - Data handling with VBA	9/09/2009 at 11:59 pm	12.50%		Online	Web Submit
Project 3 - Develop Mortgage Calculator	16/09/2009 at 11:59 pm	12.50%		Online	Web Submit
Test 2	18/09/2009 at 1:00 pm	15.00%		Online	Web Submit
Project 4A - Derive Zero Rates and Cash Flow Valuation	30/09/2009 at 11:59 pm	12.50%		Online	Web Submit
Test 3	16/10/2009 at 1:00 pm	15.00%		Online	Web Submit
Project 4B - Portfolio Simulation	28/10/2009 at 11:00 pm	0.00%		Online	Web Submit
Project 5 (Optional)	28/10/2009 at 11:00 pm	0.00%		Online	Web Submit
Total		**100%**			

Notes

- 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.

Assignment Details

Excel Fitness Test (on-line test) (Due Date: Friday, 31 July 2009 at 11:00 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) **Trial Test** (Due Date: Thursday, 6 August 2009 at 12 noon)

There is a short Excel file similar in structure to what you will see it in test 1. Experience of earlier years shows that some students make errors when submitting their first FINA 415 test. This assessment component has thus been set up so that you can become familiar with submitting a completed test (use of web submit).

This test carries no weight for the final mark and your answer will not be marked.

Test 1 (during regular class time) (Due Date: Friday, 7 August 2009 at 1:00 pm)

Company financial modeling, time value of money. Practice questions and last year's test available in course directory.

Test during regular class time.

Project 1 - Company Valuation Project (Due Date: Monday, 17 August 2009 at 11:59 am)

Company valuation project
Report (hardcopy) and model (web submission) due Monday 17/08/09 noon **sharp!**
Drop off report at lecturer's office (or under door)

Joint class presentations of selected teams on 18/08/09 9-11am. Have hardcopies of your slides ready in case your team does not have to present (or even better submit them with the report a day earlier).
For details see handout in Project 1 folder on Myweb / L-drive.

Project 1 - Presentation slides (Due Date: Tuesday, 18 August 2009 at 11:00 am)

Teams not picked for presenting their company modelling report (project 1) must submit presentation slides and/or speech notes so the presentation component of project 1 can be assessed for all teams. The slides will be assessed as part of the overall project mark.
Feel free to attach the slides to the report at the time of its submission the day before.

Project 2 - Data handling with VBA (Due Date: Wednesday, 9 September 2009 at 11:59 pm)

VBA automation: prepare some data for further financial analysis. See file in Project 2 folder on Myweb / L-drive for more details. There are two versions to this project, an easier (version 2a) and a more difficult one (version 2b). **Project 3 - Develop Mortgage Calculator** (Due Date: Wednesday, 16 September 2009 at 11:59 pm)

Design a mortgage calculator
Requirements in Project 3 folder on Myweb/L-drive.

Test 2 (Due Date: Friday, 18 September 2009 at 1:00 pm)

Topics to be announced in class.

Test during regular class time.

Project 4A - Derive Zero Rates and Cash Flow Valuation (Due Date: Wednesday, 30 September 2009 at 11:59 pm)

Cash flow valuation based on real time swap rates. See Project 4A folder on Myweb / L-drive for more details.

Alternative assignment to project 4B. Pick the one you feel more comfortable with. Component weight 12.5%. If you complete both 4A and 4B, the better one will count.

Test 3 (Due Date: Friday, 16 October 2009 at 1:00 pm)

Topics to be announced in class.

Test during regular class time.

Project 4B - Portfolio Simulation (Due Date: Wednesday, 28 October 2009 at 11:00 pm)

Derive variance-covariance matrix and simulate feasible portfolios for a group of shares. Derive minimum variance and optimal portfolio through random simulation of feasible portfolios. Details in folder Project 4B on L-drive / Myweb.

Alternative assignment to project 4A. Pick the one you feel more comfortable with. Component weight is 12.5%. If you complete both 4A and 4B, the better one will count.

Project 5 (Optional) (Due Date: Wednesday, 28 October 2009 at 11:00 pm)

An optional assignment might be offered as a make up for earlier (low) marks in the projects (not for tests!). It still has to be developed and it will be announced how much it counts towards improving earlier marks.

RESOURCES

Required

There is a choice of two textbooks here. We will not fully follow either of them but they provide the best resource to study some of the finance topics covered (and as a future reference). The first one omits the use of VBA but it is much more detailed for some of the topics. Note that VBA basics are also covered in a handout.

Benninga, Simon. Principles of finance with Excel. New York : Oxford University Press, 2006. ISBN: 0195301501 This text omits the use of VBA. Library call number **HG173 .B463 2006**

OR

Benninga, Simon. *Financial Modeling*, MIT Press. 3rd edition (2008). ISBN 978-0-262-02628-4, Library call number **HG173 .B46 2008**

Recommended

Other Resources

Understanding Financial Statements / Financial Accounting

Fraser, L. M., & Ormiston, A. (2007). Understanding financial statements (8th ed.). Upper Saddle River, N.J.: Prentice Hall.

Excel/VBA Resources:

Blattner, P. (2001). *Using Microsoft Excel 2002* (Special ed.). Indianapolis, Ind.: Que. (available as ebook from the 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 the library. ***http://site.ebrary.com.ezproxy.waikato.ac.nz/lib/waikato/Doc?id=10066542***)

Girvin, Michael (2008). ExcelIsFun's Playlists on YouTube. Retrieved 31/7/2008 from
http://www.youtube.com/profile_play_list?user=ExcelIsFun
http://flightline.highline.edu/mgirvin/ExcelIsFun.htm

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

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**

Walkenbach, J. (2007). Excel 2007 power programming with VBA. Hoboken, N.J. Chichester: Wiley ; John Wiley distributor. HF5548.4 .M523W36 2007

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

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.

Title	Topics
Week 1 - Course Week 1 beginning 13/07/2009	Introduction and Company Financial Statement Modeling Introduction, accounting basics required for company financial modeling. Start work on Contact Energy valuation model. Excel: basic tips to set up & manipulate spreadsheets
Week 2 - Course Week 2 beginning 20/07/2009	Building a simple financial model for company analysis, discounted cash flow valuation, dividend discount model (Benninga 2000 textbook chapters 2,3,4,28) Excel: financial functions (Benninga 2000 textbook chapters 1,29.2)

Week 3 - Course Week 3 beginning 27/07/2009	Company financial analysis continued: Cost of capital, EVA credit analysis. Introduction to project 1 company valuation assignment. Trial test (Friday) to get familiar with test format. Excel: Start introduction to VBA Excel (Benninga 2000 textbook section VI)
Week 4 - Course Week 4 beginning 3/08/2009	Excel: Introduction to VBA continued (editor, debugging, control structures). Build slot machine in VBA. (Benninga 2000 textbook section VI)
Week 5 - Course Week 5 beginning 10/08/2009	Guided lab session to work on projects 1 & 2 Excel: Data handling incl. introduction to pivot tables
Week 6 - Course Week 6 beginning 17/08/2009	Class presentations company valuation project (Project 1) Introduction to project 3 (mortgage calculator) Excel: Introduction to VBA continued (functions, controls)
Week 7 - Teaching Recess Week 1 beginning 24/08/2009	Teaching Recess
Week 8 - Teaching Recess Week 2 beginning 31/08/2009	Teaching Recess
Week 9 - Course Week 7 beginning 7/09/2009	Theory & formulas mortgage calculator (project 3) Data tables applied to NPV of project (including use of conditional formatting) and Black & Scholes option valuation function. (Benninga 2000 textbook chapter 16) Excel: Introduction to VBA continued (Active-x controls, events)
Week 10 - Course Week 8 beginning 14/09/2009	Excel: Text function example Free lab session to practise and/or ask questions on project 3 or test 2
Week 11 - Course Week 9 beginning 21/09/2009	Theory of fixed income analytics, term structure of interest rates, linear interpolation in preparation of project 4 (Cash Flow Valuation) Excel: Lookup & reference functions, array functions, Internet data links into Excel
Week 12 - Course	Introduction to Portfolio Models(Benninga 2000 Chapter 5): Statistical parameters, efficient frontier etc.

Week 10 beginning 28/09/2009	Excel: more practice with data handling features
Week 13 - Course Week 11 beginning 5/10/2009	Matrix algebra applied to portfolio theory. CAPM Excel statistical tools (determine CAPM Beta) Visualization of financial data Optimizations with Excel Solver
Week 14 - Course Week 12 beginning 12/10/2009	Course review and demonstration of some more advanced models to be covered in the advanced financial modeling paper (FINA 515). Review topics covered in test 3.

REVIEW AND EVALUATION

There will be an specific on-line evaluation of course content and the lecturer. Link to survey will become live towards the end of the course.

LINKAGES TO OTHER PAPERS

Pre-requisites: FINA311 or FINA312 or equivalent

DEPARTMENTAL POLICY