



**NATIONAL UNIVERSITY OF SINGAPORE**  
**Department of Finance**



FIN3130: Financial Modeling

**Semester 1, 2015/2016**

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**Consultation Hrs:** By appointment through email

## Course Objective

This course has the following objectives:

- 1) provides students with an appreciation of the theories and methodologies of financial modeling.
- 2) trains students to apply finance theories to solve various problems in financial management, investments, portfolio management, and risk management.

This objective is achieved by teaching on how to design and implement financial models in the computer, with Excel as the main tool. It covers four classes of models: Corporate Finance models, Portfolio Models, Option-Pricing Models and Bond Models. It also covers simulation, some numerical methods, and VBA programming as well.

## Motivation

With the increasing sophistication in financial models, and the advance in IT, finance professionals and researchers increasingly need to perform basic financial modeling and data processing using the computer on their own. Among the software used for such purposes, Microsoft Excel stands out as the default standard. Some finance professionals, for instance from investing banking, would go to the extent of recognizing Microsoft Excel as the single software that they would have to consistently use for the rest of their career. Therefore it is not only crucial to learn how to implement financial models in the computer, but especially using the advanced tools and VBA in Excel as well. This subject complements and enhances the other finance modules currently offered in the following ways:

- 1) concretizes the theoretical finance theories into implementable methods. This enhances the practical ability of the finance students.
- 2) prepares the students for financial modeling work, including model design, sourcing for data, model programming and debugging.
- 3) discusses the concept of efficiency and effectiveness when implementing financial models. This would be the only module that discusses such important perspective.

## Learning Outcome

By the end of the course, students:

- learn of the four major classes of financial models and how to implement the models
- inherit a set of ready-to-go financial models which they can use in their professional or research work
- are able to design and put together financial models for analyzing and solving financial problems.
- are able to critique and improve on the efficiency and effectiveness of financial models.

## Mode of Teaching

The course will be delivered as a series of 13 three-hour sessions in a computer lab. In each session, the student will go through each financial model hands-on with the computer as they are covered in class. Thus each computer needs to have

- 1) Microsoft Excel (the latest version), with the Solver add-on and Visual Basic for Applications add-on.
- 2) internet access
- 3) access to NUS library's e-database (via the individual student's log in)

## Flipped Classroom

The course will be delivered using the flipped classroom methodology. In the flipped classroom methodology, students are to learn their "lectures" at home and do their "homework" in class. This is detailed in the following points:

- 1) Students shall watch the videos and learn the lesson before the class session.
- 2) Each student will take an individual closed-book quiz at the start of each class.
- 3) Students will do worksheets in groups. The worksheets will cover the material of that week.

## Advantages

- 1) Students can understand the lecture at their own time and pace.
- 2) Students have closer coaching by the instructor during class.
- 3) Students are trained in doing group work.
- 4) Students learn to take responsibility for their own learning, and develop the skills for life long learning.

## Pre-requisite

ACC1002 Financial Accounting, FIN2004 Finance, and FIN3102 Investment Analysis and Portfolio Management.

## Reference Text

(SB) Financial Modeling, by Simon Benninga, MIT Press, 4th Edition, 2014, ISBN: 978-0262027281.

## Assessment

This is a 100% CA course. The weight distribution for different components is as follows:

Mid-Term	30
Final Quiz	30
Project	30
Class Participation	10
<b>Total</b>	<b>100</b>

## Mid-Term Quiz

Date: Week of Sep 28 (In Class)

The mid-term quiz will be a 1.5 hour close-book practical test done in the computer lab. This quiz covers lessons 1 to 6. It will be held during class hours. Students are to make sure that they are available to sit for the mid-term.

## Final Quiz

Date: Week of Nov 9 (In Class)

The final quiz will be a 1.5 hour close-book practical test done in the computer lab. This quiz covers lessons 7 to 12. It will be held during class hours. Students are to make sure that they are available to sit for the mid-term.

## Other points to note

- **Attendance:** Since this is a 100% CA course, students must not miss more than 2 classes (not including absence due to medical (accompanied by medical certificates) or compassionate reasons). Violators will be heavily penalized or may even fail the entire module.
- **CA Attendance:** Students who miss any CA component will receive zero marks for that particular component. Absentees due to medical (accompanied by medical certificates) or compassionate reasons may be given a substitute form of assessment.
- Students are encouraged to always feedback to the instructor comments and suggestions that may help the class to learn better.
- Students are to check the IVLE weekly for announcements.
- Please use the forum in IVLE exclusively for students' discussions
- Please use NUS e-mail for e-mail communications

## Academic Honesty & Plagiarism

Academic integrity and honesty is essential for the pursuit and acquisition of knowledge. The University and School expect every student to uphold academic integrity & honesty at all times. Academic dishonesty is any misrepresentation with the intent to deceive, or failure to acknowledge the source, or falsification of information, or inaccuracy of statements, or cheating at examinations/tests, or inappropriate use of resources.

Plagiarism is 'the practice of taking someone else's work or ideas and passing them off as one's own' (The New Oxford Dictionary of English). The University and School will not condone plagiarism. Students should adopt this rule - You have the obligation to make clear to the assessor which is your own work, and which is the work of others. Otherwise, your assessor is entitled to assume that everything being presented for assessment is being presented as entirely your own work. This is a minimum standard. **In case of any doubts, you should consult your instructor.**

Additional guidance is available at:

<http://www.nus.edu.sg/registrar/adminpolicy/acceptance.html#NUSCodeofStudentConduct>

Online Module on Plagiarism:

<http://emodule.nus.edu.sg/ac/>

## Tentative Lesson Schedule:

Lesson	Week Starting	Topic and Activity	Chapters
1	Aug 10	<b>I) Corporate Finance Models:</b> <ul style="list-style-type: none"> <li>• Excel Functions</li> <li>• Data Tables</li> <li>• Some Excel Hints</li> </ul> VBA: Output to Cells	VBA notes SB: Ch. 33, 30, 35
2	Aug 17	<ul style="list-style-type: none"> <li>• Basic Time Value Models</li> <li>• The Financial Analysis of Leasing</li> <li>• The Financial Analysis of Leveraged Leases</li> </ul> VBA: For Next Loop 1	SB: Ch 1, 6, 7
3	Aug 24	<ul style="list-style-type: none"> <li>• Financial Statement Modeling</li> </ul> VBA: For Next Loop 2	SB: Ch. 3
4	Aug 31	<ul style="list-style-type: none"> <li>• Calculating the Cost of Capital</li> </ul> <b>II) Portfolio Models:</b> <ul style="list-style-type: none"> <li>• Matrices</li> <li>• Using Array Functions and Formulas</li> <li>• Portfolio Models: Introduction</li> </ul> VBA: If Then Else 1	SB: Ch. 2, 31, 34, 8
5	Sep 7	<ul style="list-style-type: none"> <li>• Efficient Portfolios When There Are No Short-Sale Restrictions</li> <li>• Alternative Variance-Covariance Matrix</li> </ul> VBA: If Then Else 2	SB: Ch. 8, 9, 10
6	Sep 14	<ul style="list-style-type: none"> <li>• Efficient Portfolios without Short Sales</li> </ul> VBA: Do While, Do Until Loops	SB: Ch. 12
	Sep 21	<b>Recess Week</b>	
7	Sep 28	<b>Practical Quiz 1 (1.5 hrs)</b> <ul style="list-style-type: none"> <li>• Information from the Web</li> </ul>	SB: Ch. 41
8	Oct 5	<b>IIa) Introduction to VBA</b> <ul style="list-style-type: none"> <li>• User-Defined Functions with VBA</li> <li>• Variable Types</li> <li>• The Black-Litterman Approach</li> <li>• Value at Risk (VaR)</li> </ul> VBA: Select Case Statement	SB: Ch. 36, 37, 13, 15
9	Oct 12	<ul style="list-style-type: none"> <li>• Arrays</li> </ul> <b>III) Option-Pricing Models</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• The Black-Scholes Model</li> </ul>	SB: Ch. 39. 16, 19
10	Oct 19	<ul style="list-style-type: none"> <li>• Generating Random Numbers</li> <li>• Modeling the Stock Price</li> </ul>	SB: Ch. 29, 18
11	Oct 26	<ul style="list-style-type: none"> <li>• Using Monte Carlo Methods For Option Pricing</li> <li>• Intro to Monte Carlo Methods</li> <li>• Binomial Option-Pricing Model</li> </ul> VBA: Forms	SB: Ch. 23, 22, 17
12	Nov 2	<b>IV) Bonds</b> <ul style="list-style-type: none"> <li>• Duration</li> <li>• Immunization Strategies</li> <li>• Modeling the Term Structure</li> <li>• Calculating Default-Adjusted Expected Bond</li> </ul>	SB: Ch. 25-28

		Returns	
13	Nov 9	<b>Practical Quiz 2 (1.5 hrs)</b>	