Amsterdam Institute of Finance

ADVANCED FINANCIAL MODELING WITH EXCEL VBA

INSTRUCTOR: VISWANATH TUMU

Course Description

The Advanced Financial Modeling course exposes participants to the technology and tools for building models in the areas of finance, marketing, accounting, econometrics, public policy, and other areas – function area is of no consequence since every modeling situation is envisioned to comprise of variables and the challenge in building a model is to, (a) decompose a situation into constituent variables, (b) establish valid relationships amongst variables, and (c) map variables (and relationships) to a modeling eco-system on a PC.

A properly designed model enables a situation to be easily examined and its dimensions intricately manipulated to facilitate optimal decision making, whether it is a mergers & acquisitions model, an option pricing model, a budget, a securitization model, a model to forecast operations of an enterprise, a tax collections model or a lease pricing model.

To build powerful models, participants must learn to work with advanced features of Excel and more importantly, its programming counterpart, Visual Basic. Therefore, this course devotes a substantial amount of time to discussing Excel and Visual Basic and anchors the topics with examples of real-life models so that participants may simulate the process to develop models that address their unique requirements.

Key Benefits of attending this Course

- Be exposed to advanced features of Excel
- Be exposed to an intensive use of Visual Basic and User Forms in developing models
- Learn to work with Excel and User Forms as two distinct platforms for developing sophisticated financial models
- Learn to employ the IPO (Input, Processing and Output) framework in constructing models
- Learn to construct models that apply to all functional areas
- Learn to use Visual Basic for Applications to escalate to the next level of financial model building
- Examine models used in real-life project appraisals
- Examine code behind several models developed by the course director

Note: This course is not a "how-to" on Excel. Participants will be expected to be familiar with Excel operations. Discussions in Excel will concentrate on the "advanced" aspects of Excel such as Arrays, Data Tables, and so on. Participants are also required to prepare for the course via background reading material supplied 4 weeks prior to the course.

Resources Received by Participants

Participants will receive more than 2,000 pages of valuable background reading material, cases and program slides. In addition, they will receive a complimentary copy of *CapInvest,* a financial model developed by the instructor using the same concepts that will be discussed in the course.

Who Should Attend?

The course will be useful to participants from all disciplines and function areas: treasury, accounting, budgeting, human resources, marketing, stockbroking, manufacturing and engineering, infrastructure, life science, consumer finance and insurance companies, sports and entertainment sector companies, banks and financial institutions, etc.

Practical information

Participants will need to bring laptop computers equipped with Microsoft Excel 2000 or higher (preferably in English language). If requested, a laptop can be provided at an additional charge.

DAY 1 - AN OVERVIEW OF MODELING

Introduction to Financial Modeling

- Definition of financial modeling
- The six distinct components in financial modeling: process, situation, variables, relationships, dimensions, decision-making
- What is *not* a financial model?
- Advantages of the financial modeling framework
- The IPO (Input, Processing and Output) framework
- Examples of variables and relationships
- Layout issues in building a financial model
- Examples of types of models
- Examples of models in non-finance areas: Marketing, Human Resources.

Databases and Spreadsheets

- Difference between a database and a spreadsheet
- Role of a database in relation to a spreadsheet
- The need to intermingle in a solution
- Examples of production quality relational databases
- Other relational databases
- Programming language for manipulating databases
- The important role of excel as a flat file database
- Excel architecture overview
- Databases wrap-up

Overview of Excel 2007

- New features
- The Ribbon
- Excel 2007 statistics

Accessing Excel

- Two ways to access the functionality of Excel: GUI and Code
- Overview of code
- Objects
- Collections
- Platforms for building models: Worksheet and User Form

Modeling Platforms

- Example of employing a Worksheet as a platform for a modeling situation
- Example of employing a User Form as a platform for a modeling situation

Requirements for Developing Financial Models

- Model building concepts: variables, relationships, inputs, processing, outputs, layout issues
- Technical skills in Excel: excel object hierarchy, object properties and methods, excel events, Visual Basic for Applications.

ADVANCED EXCEL - PART I

Overview of Advanced features of Excel and its significance in Financial Modeling

- Arrays
- Functions
- Names
- Number formatting
- Data validation
- Excel Controls
- Report Manager add-in
- Data management
- What-if analysis
- Grabbing data from the Internet

Excel Arrays

- Examples of use of arrays to solve advanced problems
- Defining arrays
- Entering array constants
- Cells holding an array formula

Excel Functions

- Sources of Excel's functionality
- Types of Excel functions: built-in, Analysis ToolPak, user-defined, add-ins
- 9 categories of built-in Excel functions
- Functions: user defined
- Functions: add-ins
- Using a function and determining function parameters
- Function return value
- Creating a user defined function
- Examples of some important functions
- Using Edit / Go To / Special

Excel Naming Scheme

- Importance of names in Excel
- Naming cells, constants and formulas
- 3-D Names
- Naming benefits
- Names examples

Excel Formatting Scheme

- Formatting values
- Number formatting options
- Custom number format
- Examples of Custom Format
- Formatting codes
- Date and time formatting codes
- Formatting examples
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Data Validation

- Basics
- Defaults
- Lists
- Custom
- Prompts

DAY 2 - ADVANCED EXCEL - PART II

Excel Controls

- Types of Excel controls
- Placing controls on a worksheet
- Linking controls to cells
- Attaching procedures to controls

Excel Data Management Features

- Data management features in Excel
- Five stages of data manipulation
- The "Three I's" of sources of data: Imported, Inputted, Internet
- Data filter
- Operators for filtering
- Advanced filtering procedures
- "D" functions
- Data management examples

Excel Pivot Tables Feature

- What is a Pivot Table?
- Pivot table basics
- Pivot table examples

What-if Analysis

- Types of "What If?" Analysis in Excel: Data Tables, Goal Seek, Scenario Manager, Solver
- Customized "What if?" analysis
- Data Tables: one-variable and two-variable
- Goal Seek
- Solver
- Solver algorithms and examples
- Scenarios

Report Manager Add-In

- Functionality of Report Manager
- Examples

Grabbing Data from Internet

- Web queries
- Import commands
- Creating a new Web query

LEARNING TO PROGRAM IN EXCEL - PART I

Introduction to Programming

- MS Office programming architecture
- Entry points into Excel
- Graphical User Interface tools vs. code
- Using objects, properties and methods to manipulate Excel
- Examples of VBA Code
- Ways to execute code
- Built in modules vs. user modules
- Benefits of Code
- Executing Visual Basic code
- Manipulating Excel with objects, properties and methods

Excel Object Hierarchy

- Scope of object properties and methods
- Object collections
- Microsoft Excel object models
- Object properties
- Object methods

Excel Event Procedures

- Events supported by Excel
- Using Events to hook code

DAY 3 - LEARNING TO PROGRAM IN EXCEL - PART II

Excel Macro Recorder

- Excel macro recorder
- Hands-on programming of simple tasks in Excel

Writing Visual Basic Code

- Overview of Visual Basic code
- Parts of a Visual Basic procedure

Visual Basic Decision Structures

- Visual Basic decision Structures
- Visual Basic control Structures

Visual Basic Controls

- Visual Basic controls
- Visual Basic user forms
- Visual Basic toolbox
- Alternatives to forms

Visual Basic Functions

Useful Objects

- A Closer look at the Range Object
- The Range Object: properties and methods
- The Worksheet Object: properties, methods and events

Visual Basic / Other

- Variables and Constants
- Arrays
- Operators

DAY 4 - MODELING PROJECTS

Building on the exposure to Advanced Excel and VBA in prior sessions, participants proceed to examine, interactively, the architecture of several real-life models and the code and features behind these models:

- *Securitization Model*
  Illustrating an example of an educational institute in India, faced with the situation of either taking a loan from a bank or securitizing its fee income to finance a school building

- *Share Price Forecasting Model*
  Illustrating the concept of a 'Black Box' in preparing a financial model that isolates important decision making information and variables to assist users to perform useful tasks without attention being diverted by large volumes of data

- *Monte Carlo Simulation*
  An Investment Scenario: Illustrating the development of a Monte Carlo Simulation Model to carry out an analysis of a project rate of return

- *Simulating a HP Financial Calculator*
  This model simulates the financial functions in a HP financial calculator using Visual Basic Code to illustrate the fact that Excel's built-in financial functions such as Present Value, PMT and the others alone cannot build the simulator – these functions can generate an answer given information on the remaining 4 variables but auto-calculation of any of the functions given info on the remaining variables is ruled out because a cell can be used for entering either a formula or a constant (but not both, as required by the simulator).

- *Risk-Return Pricing Model*
  Illustrating the use of a financial model that assists financial institutions in developing pricing for loans, leases and hire purchases

- *Vehicle Financing Model*
  Illustrating the development of an "error-resistant' model to price vehicle financing transactions using the five discounted cash flow components

- *Project Appraisal Model of a Leasing Investment in Ukraine*
  Provides insights into a sophisticated project appraisal model, LeaseEx, that assists financial institutions in forecasting leasing operations of a start-up leasing company over a 10-year horizon, constantly updating more than 180 reports in response to changes to any of the more than 2,000 variables that constitute the eco-system of this model

Review and Question and Answer Session

About the Instructor

Vish Tumu is principal consultant of Vish Tumu Associates, a U.S. and India based consulting firm that advises international financial institutions, including the World Bank, the International Finance Corporation, and the Inter-American Development Bank. He has carried out assignments in more than 24 countries.

Vish has more than 14 years of experience in financial modeling and Microsoft Excel, and has developed *CapInvest* a sophisticated financial model that is used by financial institutions to create a range of financial and savings products.

He holds a Masters degree in International Finance from Columbia University, New York and is a registered Chartered Accountant from the Institute of Chartered Accountants of India. He is a co-author of a book on leasing *"The Principles and Practice of Leasing"* published in the U.K. in 1990, has published several articles, and is a regular contributor to the *World Leasing Yearbook*, published by Euromoney Publications, U.K. Reflecting his expertise with Excel, he was invited by Microsoft Corporation to beta test the new Office 2007.

In the past, he worked with the ICICI Bank, the premier development bank in India and AF Ferguson & Co. (part of Ernst and Young), in India.