

## **FINANCE 707 – Financial Modeling Using Excel & VBA Winter 2024 Course Outline**

### **Finance and Business Economics Area DeGroote School of Business McMaster University**

#### **COURSE DESCRIPTION**

Financial modeling involves the creation of tools that someone, other than the writer, can use to answer “what if” questions in finance. The course will examine the tools built into Excel and VBA and their use in financial modeling, with an emphasis on documentation and industry best practices. The models used for this purpose cover applications such as financial statement forecasts, asset and derivatives pricing, portfolio management, risk management, and trading.

A working knowledge of Excel is assumed although no prior experience with VBA is required. Students will also be introduced to Python programming in the context of financial modeling.

#### **INSTRUCTOR AND CONTACT INFORMATION**

Class Timing: **Wednesdays at 7.00 PM**

*All times referenced in this document are Eastern.*

**Adeel Mahmood**

Instructor

*Office Hours:* Before class, or by appointment

#### **COURSE ELEMENTS**

Credit Value:	3	Leadership:	Yes	IT skills:	Yes	Global view:	Yes
Avenue:	Yes	Ethics:	No	Numeracy:	Yes	Written skills:	Yes
Participation:	Yes	Innovation:	Yes	Group Work:	Yes	Oral skills:	Yes

#### **COURSE PREREQUISITES AND COMPLEMENTS**

Students should have the academic credit of FIN 601 – or equivalent preparation – prior to the start of this course.

## **COURSE OVERVIEW**

What is the difference between making a purpose-built spreadsheet and financial modeling? Financial modeling is much more flexible and can be easily modified to solve a wide array of problems. This course will examine the tools built into Excel and VBA and their use in financial modeling – and will also draw upon relevant Python libraries to enhance the models.

We will begin with financial statement modeling and valuations and sample a range of company models. As much as possible, we will work on a model of a real company with recent annual or quarterly financial statements.

The course will then move into a broader set of spreadsheet models used for asset and derivatives pricing, portfolio management, and risk management. We will get to work with external databases such as those available through Bloomberg terminals as well as on public websites.

VBA and Python programming be delved into next with a focus on finance applications. No prior knowledge of either tool is assumed. The course will also provide preview of major use cases that students can analyze for their own final projects.

## **LEARNING OUTCOMES**

Upon successful completion of the course, students will be able to:

- Identify the key finance and accounting terms and concepts used in financial models.
- Apply best practices and efficiency tools for general-purpose spreadsheet modeling.
- Determine the key input variables to and report key outputs of a range of financial models.
- Integrate major components of their models, and perform key sensitivity and scenario analyses under a range of assumptions.
- Learn to document the details of and test a financial model.
- Learn to work with and use a range of external data in a spreadsheet model.
- Gain hands-on knowledge of advanced Excel modules to enhance their models.
- Become proficient with VBA, enough to be viewed as the "resident expert" in many situations.
- Develop an understanding of how to use Python libraries to extend the models.

## **REQUIRED COURSE MATERIALS AND READINGS**

Course content and class communication available on Avenue:

- <http://avenue.mcmaster.ca>

## OPTIONAL COURSE MATERIALS AND READINGS

Benninga and Mofkadi; Financial Modeling; *Fifth (5<sup>th</sup>) Edition*; The MIT Press, 2022:

- Finance-focused modelling text, also useful in other finance courses

Walkenbach; Excel 2019 Bible; *First (1<sup>st</sup>) Edition*; Wiley, 2019:

- Traditional manual for Excel, without any particular finance focus
- Helpful in gaining understanding of broader Excel usage

## EVALUATION

Individual learning in this course results from model building, problem solving, and lab work. Team learning focus of this course is on two assignments and an applied group project centred on a financial model.

The final grade will be calculated as follows:

### Components and Weights

Term Tests	Written in person during class hours (individual)	2 x 25%
Spreadsheet Assignments	Due online during the term (group)	2 x 10%
Group Project	Due online at the end of the term (group)	30%
<b>Total</b>		<b>100%</b>

### Grade Conversion

At the end of the course, your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme:

LETTER GRADE	PERCENT	POINTS
A+	90-100	12
A	85-89	11
A-	80-84	10
B+	75-79	9
B	70-74	8
B-	60-69	7
F	00-59	0

Note that the calculated grade in the course may be subject to an overall adjustment to bring the class average in line with the established grade ranges of the Masters of Finance Program.

## **Term Tests**

Two (2) term tests – ***open-book, open-notes*** tests – will be written during the scheduled class hours in the term. Refer to the course schedule for specific dates and times.

A student ***missing a Term Test*** is required to contact the ‘Student Experience – Academic Office’ and obtain an official approval of relief if he or she wishes to avoid getting a zero (0) grade for the test. If ‘Student Experience – Academic Office’ adjudicates that relief be provided, the student will be able to write an alternate exam, in lieu of the missed test, during the final exam period at the end of the term.

## **Spreadsheet Assignments**

The ***Spreadsheet Assignments*** are completed in groups, submitted online, and focused on the concepts introduced in the course. Refer to the course schedule for specific deadlines.

Students will form groups for this component. Each student group will also complete the ***Group Project*** as described elsewhere in this document. *The group members will be assigned individual grades relative to the group grade based on the peer assessments completed towards the end of the course.*

## **Group Project**

Students will form groups for this component. Each student group will also complete the ***Spreadsheet Assignment*** as described elsewhere in this document. *The group members will be assigned individual grades relative to the group grade based on the peer assessments completed towards the end of the course.*

The ***Group Project*** is **due at the end of the term**. The project will entail building and documenting a real-life financial model using the concepts covered in the course.

Any student missing the submission deadline will be subject to a marks deduction equal to 25% of the project grade for each day rounded **up** that the submission is late.

<b>COMMUNICATION AND FEEDBACK</b>
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Students that are uncomfortable in directly approaching an instructor regarding a course concern may send a confidential and anonymous email to the respective Area Chair or Associate Dean:

<http://mbastudent.degroote.mcmaster.ca/contact/anonymous/>

Students who wish to correspond with instructors or TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student. Emails regarding course issues should NOT be sent to the Administrative Assistant.

Instructors should conduct an informal course review with students to allow time for modifications in curriculum delivery. Instructors should provide evaluation feedback for at least 10% of the final grade to students prior to Week #8 in the term.

### **COURSES WITH AN ONLINE ELEMENT**

Our course may use on-line elements (e.g. e-mail, Avenue to Learn, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, usernames for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

### **CONDUCT EXPECTATIONS**

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the ***Code of Student Rights & Responsibilities*** (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of A2L, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

### **EXTREME CIRCUMSTANCES**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

## COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Speak with the instructor if this is a concern for you.

## ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, such as the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty, refer to the policy:

[www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity)

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations

## GENERATIVE AI

Students are **not permitted** to use generative AI to complete any graded assessments in this course. In alignment with McMaster academic integrity policy, it “shall be an offence knowingly to ... submit academic work for assessment that was purchased or acquired from another source”. This includes work created by generative AI tools. Also stated in the policy is the following: “Contract Cheating is the act of outsourcing of student work to third parties with or without payment.” Using generative AI tools is a form of contract cheating. Charges of academic dishonesty will be brought forward to the Office of Academic Integrity.

## COURSE MODIFICATION

From time to time, there may be a need to add and/or remove topics or to change the schedule or delivery format. If these are necessary, you will be given as much advance notice as possible.

## REQUESTING RELIEF FOR MISSED ACADEMIC WORK

In the event of an absence for medical or other reasons, students should review and follow the Missed Term Work regulations that are outlined on the Master of Finance website:

<https://mfin.degroote.mcmaster.ca/current-students/missed-term-work/>

## STUDENT ACCESSIBILITY SERVICES

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail [sas@mcmaster.ca](mailto:sas@mcmaster.ca).

For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities:

<http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

## ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

## ACKNOWLEDGEMENT OF COURSE POLICIES

Your registration and continuous participation (e.g. on A2L, in the classroom, etc.) to the various learning activities of this course will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on A2L. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.

<b>COURSE SCHEDULE</b>			
<b>Wk.</b>	<b>DATE</b>	<b>CONTENT</b>	<b>TOOLS</b>
1	Wed. Jan 10	<b>Intro, Financial Statement Modeling I</b> Forecasting financial statements using spreadsheets	Various Excel functions / tools
2	Wed. Jan 17	<b>Financial Statement Modeling II</b> Integrating financial statement worksheets, full financial model	Various Excel functions / tools
3	Wed. Jan 24	<b>Financial Statement Modeling III</b> Financial statement modules	Various Excel functions / tools
4	Wed. Jan 31	<b>Financial Modeling of Banks / Financial Services</b> Application to banking financials / valuations	Various Excel functions / tools
5	Wed. Feb 7	<b>Term Test 1 (Written in Class)</b>	
6	Wed. Feb 14	<b>General Spreadsheet Modeling</b> Spreadsheet modeling with loops, lookups, data display, and what-If analysis	Datatables, lookups, arrays, pivot tables
7	Feb 19 to 23	<b>Midterm Recess (No Class)</b>	
8	Wed. Feb 28	<b>Forecasting and Optimization</b> Optimization techniques, application to portfolio and risk management	Solver, Analysis Toolkit, Scenario analysis
-	Mon. Mar 4	<b>Spreadsheet Assignment One – Due online by 10.00 AM</b>	
9	Wed. Mar 6	<b>VBA / Programming I</b> Intro to programming and VBA	VBA and programming basics
10	Wed. Mar 13	<b>VBA / Programming II</b> VBA for finance applications, debugging	Extended VBA tools
11	Wed. Mar 20	<b>Term Test 2 (Written in Class)</b>	
12	Wed. Mar 27	<b>VBA / Programming III</b> Intro to Python, VBA user interfaces	Python basics, debugging tools
-	Mon. Apr 1	<b>Spreadsheet Assignment Two – Due online by 10.00 AM</b>	
13	Wed. Apr 3	<b>Working with External Data</b> Integration with external data sources and databases	Bloomberg, online databases
14	Wed. Apr 10	<b>Python Libraries + Project</b> Using Python libraries, project guidance	Python libraries
-	Mon. Apr 15	<b>Group Project – Due online by 10.00 AM</b>	