Commerce 3FD3
Financial Modelling
Winter 2026 Course Outline

Finance and Business Economics Area
DeGroote School of Business
McMaster University

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Yingnan Zhao

Email: zhaoy502@mcmaster.ca

Sections: C01: Wednesdays, 11:30-14:20, C02: Tuesdays, 11:30-14:20, C03: Mondays, 11:30-14:20

See Mosaic for the venue.

Office Hours: By appointment

Teaching Assistant: Hao Huang

Email: huanh72@mcmaster.ca

Office Hours: Details to be provided on A2L after the semester starts

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COURSE ELEMENTS

Credit Value:	3	Leadership:	No	IT skills:	Yes	Global view:	No
A2L:	Yes	Ethics:	No	Numeracy:	Yes	Written skills:	Yes
Participation:	Yes	Innovation:	Yes	Group work:	Yes	Oral skills:	No
Evidence Based:	Yes	Experiential:	Yes	Final Exam:	Yes	Guest speaker(s):	No

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COURSE FORMAT

The three hours of class time will consist of lectures and in-class problem-solving where students work hands-on with Excel and Python to analyze financial decision-making problems. There will be a 10-minute break approximately every 50 minutes.

COURSE INFORMATION

Course Delivery Mode: In-person

This three-credit elective undergraduate course provides an applied introduction to financial modelling using MS Excel and Python. The course emphasizes how these tools can be used to structure and analyze real-world financial problems and to support financial decision-making through case-based discussions and group projects. Rather than focusing solely on technical implementation, the course integrates case-based modelling, AI-supported analysis, and professional communication of financial recommendations.

Prerequisites: Introduction to Finance (COMMERCE 2FA3 or IBH 2BB3) and registration in Level III or above in any Honours Bachelor of Commerce or Engineering and Management program, or a relevant minor. Strong knowledge of statistics is highly recommended. Working knowledge of MS Excel is assumed; no prior experience with Python is required.

Core financial modelling concepts are first introduced using Excel to build intuition. Python is then introduced to illustrate alternative and scalable ways of implementing similar models. While the first half of the course relies primarily on Excel, Python is gradually introduced early in the term as a parallel tool to reduce the learning burden for students with no prior programming experience. By the second half of the course, Python becomes the primary tool for portfolio analysis and simulation. Both tools are applied progressively to financial modelling problems discussed in the same or subsequent lectures.

Note: Non-Commerce students may enrol in specific upper-year Commerce courses if they have been accepted into a Specialized Minor offered by the Faculty of Business or can demonstrate that they are pursuing an interdisciplinary minor for which the specific Commerce courses are included.

COURSE LEARNING OUTCOMES

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

- Develop and apply conceptual frameworks to structure and solve financial modelling problems.
- Build and implement financial models using MS Excel and Python.
- Apply Excel, Python, and AI-supported workflows to analyze financial decisions and communicate results in a professional format.

COURSE LEARNING GOALS

Upon successful completion of this course, students will:

- Develop practical skills in using quantitative tools to support managerial and financial decision-making.

- Learn the fundamentals of programming in Python for financial applications, and gain experience using Excel and Python libraries and functions commonly employed in financial modelling.
- Build AI literacy, including the ability to evaluate, interpret, and responsibly integrate AI-generated outputs in financial modelling contexts.

REQUIRED COURSE MATERIALS AND READINGS

Required:

- Avenue registration for slides, readings and other course materials: http://avenue.mcmaster.ca

Optional:

- Benninga; Financial Modeling; Fifth Edition; The MIT Press, 2022. ISBN: 978- 0262046428. $168.95. The textbook is a Finance-focused modelling text, also useful in other finance courses, that covers practical examples in finance in Excel. Students may use an earlier edition or a second-hand textbook.
- Yves Hilpisch, Python for Finance: Analyze Big Financial Data, 2014. ISBN: 978-1491945285. The textbook is a hands-on guide that helps both developers and quantitative analysts get started with Python and guides you through the most important aspects of using Python for quantitative finance.
- Rosenbaum, J., Pearl, J., Investment Banking, (Second Edition - University Edition) Wiley, 2013. ISBN: 978-1-118-47220-0. The textbook focuses on the primary valuation methodologies that are widely used in the industry.

COURSE EVALUATION

The following weighting scheme will be used:

#	Grade Component	Weight
1	8 Weekly Studios (Top 7 out of 8)	20%
2	3 Case Study / AI Assignments: Decision-Making with Financial Modelling	40%
3	Final Exam: Cumulative and Computer-based (in Python and Excel). Date to be determined	40%
	Total	**100%**

COURSE DELIVERABLES

Weekly Studios

Weekly studios are designed to build students' confidence and technical proficiency in using Excel and Python to implement core financial modelling components. Each studio focuses on a specific modelling block (e.g., time value of money, DCF valuation, bond pricing, portfolio risk), providing structured, hands-on practice that prepares students to integrate these components into larger, real-world decision models.

Weekly studios consist primarily of model-dependent multiple-choice questions. Although grading is based on the multiple-choice questions, students are required to submit a corresponding Excel or Python (.ipynb) file demonstrating their modelling work. Submitted files may be reviewed for completeness and reasonable structure through random audits. If a submitted file does not reflect an attempt to correctly implement the required model, the corresponding studio may receive no credit.

Each weekly studio is designed to take approximately 45-60 minutes for a prepared student. To accommodate the exploratory nature of modelling, the lowest weekly studio score will be dropped.

#	Topic	Release (Wed)	Deadline (Tue)
1	Time Value of Money	January 14	January 20
2	Firm Valuation I	January 21	January 27
3	Firm Valuation II	February 4	February 10
4	Bond Valuation	February 25	March 3
5	Python Basics	March 4	March 10
6	Portfolio Theory I	March 11	March 17
7	Portfolio Theory II	March 18	March 24
8	Monte Carlo Simulation	April 1	April 7

Case Study / AI Assignments

There will be three group-based assignments, each centered on a financial decision-making case. Students will build models in Excel and/or Python, integrate AI-supported analysis where required by the assignment instructions, and submit a written report communicating their recommendations and supporting rationale. Detailed instructions will be released throughout the term.

Each group will consist of 4 students. You may form your own group and submit your group members via A2L by January 16. If we do not receive a submission by this deadline, you will be randomly assigned to a group. In special circumstances, some groups may consist of 3 or 5 students.

In principle, the same group will work on all three case assignments. Group changes will be considered only in exceptional circumstances. Please note that most group-related issues arise from communication challenges. Therefore, before requesting any group changes, all members must demonstrate active and good-faith efforts to communicate with one another (e.g., via email or messaging platforms).

Grades for the case assignments will be based primarily on the quality of the group submission. Peer evaluations will be used to adjust individual grades within the group to reflect relative contributions. Further details regarding the peer evaluation process will be provided with the case assignment instructions.

#	Topic	Release Date	Deadline
1	Mortgage Decisions	January 21	February 1
2	DCF Firm Valuation	February 11	February 22
3	Portfolio Analysis	March 18	March 25

Final Exam

The final exam will be cumulative, computer-based, and held in person. Students must ensure that both Python and Excel are running properly on their devices. The exam date is set by the Registrar.

The exam is partially open-book. Students may access locally saved course materials, including lecture slides, notes, and previously downloaded files, during the exam. Internet access is not permitted, and students may not open web browsers, use search engines, or access cloud-based documents.

The use of AI tools (including but not limited to ChatGPT, Copilot, or similar tools) is strictly prohibited during the exam.

Bonus Marks

Students may earn up to 5% in bonus marks through active participation in Top Hat questions during lectures, as well as selected short reflections, surveys, and/or additional assignments. Some of these activities may involve exploring the use of AI tools in learning.

- Bonus marks are optional and will only be applied to final grades below 85%.
- Bonus credit may raise a grade up to, but not above, 85% (A).
- Note: This policy ensures that bonus marks reward engagement and participation without substituting for mastery of core course material. Examples: A student earning 75% plus 5% bonus will receive 80%. A student earning 85% plus 5% bonus will remain at 85%.

Software and Technical Requirements

Python Setup Requirement

Students are required to install a Python development environment by Sunday, January 18. We recommend installing Anaconda, which provides a complete Python distribution suitable for this course. A step-by-step installation tutorial will be provided on A2L at the beginning of the term.

All Python demonstrations in lectures will be conducted using Anaconda, and all Python files used in the course will be provided in Jupyter Notebook format (.ipynb).

Students may choose to use an alternative Python platform (e.g., VS Code) provided that it is fully compatible with Jupyter notebooks (.ipynb). However, instructional support and demonstrations will assume the Anaconda environment, and students using alternative setups are responsible for ensuring compatibility.

Communication and Feedback

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 Area Administrative Assistants.

Students who have concerns about the course content, evaluation methods, or delivery should first reach out to the course instructor. If your concern remains unresolved after speaking with the instructor, you may then reach out to the relevant Area Chair for further consideration.

Missed Academic Work

Weekly studios and group case assignments are announced well in advance, providing students with sufficient time to plan and complete their work. Late submissions will not be accepted.

Requests for extensions or consideration of missed work will be handled only in accordance with McMaster University's policies on missed academic work (e.g., documented medical or compassionate circumstances). Students are responsible for notifying the instructor as soon as possible when such circumstances arise.

Requesting Relief for Missed Academic Work

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work" and the link below;

http://ug.degroote.mcmaster.ca/forms-and-resources/missed-course-work-policy/

* Non-Commerce students must follow the Missed Coursework Protocols outlined by their home faculty and Program Office.

GENERATIVE AI

Students may use generative AI tools in this course only in accordance with the guidelines specified for each activity or assessment. For example, some bonus activities and group case assignments may involve structured exploration of AI tools as part of the learning process. The use of generative AI is strictly prohibited for weekly studios and the final exam.

Whenever AI tools are used, students must clearly acknowledge or cite their use in accordance with the instructions provided for the relevant assignment. Use of generative AI outside of approved activities, or without proper acknowledgment, will be treated as academic dishonesty under McMaster University's Academic Integrity Policy.

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, e.g. 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 please refer to the *Academic Integrity Policy*, located at https://secretariat.mcmaster.ca/university-policies-procedures- guidelines/

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

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 Avenue 2 Learn, 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.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy.

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 the 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.

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 images may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

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.

Research Using Human Subjects

All researchers conducting research that involves human participants, their records or their biological material are required to receive approval from one of McMaster's Research Ethics Boards before (a) they can recruit participants and (b) collect or access their data. Failure to comply with relevant policies is a research misconduct matter. Contact these boards for further information about your requirements and the application process.

McMaster Research Ethics Board (General board): https://reo.mcmaster.ca/

Hamilton Integrated Research Ethics Board (Medical board): http://www.hireb.ca/

Acknowledgement of Course Policies

Your enrolment in Commerce 3FD3 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.

COURSE SCHEDULE

COMM 3FD3 – Financial Modelling C01 – Wednesday
Winter 2026 Course Schedule
(subject to changes during the semester)

Week	Lecture Date	Topic Description	Readings
1	07-Jan	Introduction to Financial Modelling Time Value of Money (I)	Chapters 1.1-1.7, 28
2	14-Jan	Time Value of Money (II)	Chapters 1.1-1.7
3	21-Jan	Python Basics, Numpy (I) Firm Valuation (I)	Notes and Slides, Chapters 2 and 3
4	28-Jan	Firm Valuation (II)	Chapter 4
5	04-Feb	Firm Valuation (III)	Chapter 5
6	11-Feb	Bond valuation (I) Python Introduction (II)	Chapters 7.1-7.3, Notes and Slides
7	18-Feb	***Winter Recess***	***No Classes***
8	25-Feb	Bond valuation (II)	Chapters 7.4, 7.6-7.8
9	04-Mar	Working with Data in Python, Pandas Portfolio Theory (I)	Notes and Slides, Chapter 10
10	11-Mar	Portfolio Theory (II)	Chapters 11, 12
11	18-Mar	Portfolio Theory (III)	Chapter 13
12	25-Mar	Generating Random Numbers in Python Introduction to Monte Carlo Methods (I)	Notes and Slides, Chapters 21, 22
13	01-Apr	Monte Carlo Simulation (II)	Chapters 23
14	08-Apr	Monte Carlo Simulation (III)	Chapters 24

COURSE SCHEDULE

COMM 3FD3 – Financial Modelling C02 – Tuesday
Winter 2026 Course Schedule
(subject to changes during the semester)

Week	Lecture Date	Topic Description	Readings
1	06-Jan	Introduction to Financial Modelling Time Value of Money (I)	Chapters 1.1-1.7, 28
2	13-Jan	Time Value of Money (II)	Chapters 1.1-1.7
3	20-Jan	Python Basics, Numpy (I) Firm Valuation (I)	Notes and Slides, Chapters 2 and 3
4	27-Jan	Firm Valuation (II)	Chapter 4
5	03-Feb	Firm Valuation (III)	Chapter 5
6	10-Feb	Bond valuation (I) Python Introduction (II)	Chapters 7.1-7.3, Notes and Slides
7	17-Feb	***Winter Recess***	***No Classes***
8	24-Feb	Bond valuation (II)	Chapters 7.4, 7.6-7.8
9	03-Mar	Working with Data in Python, Pandas Portfolio Theory (I)	Notes and Slides, Chapter 10
10	10-Mar	Portfolio Theory (II)	Chapters 11, 12
11	17-Mar	Portfolio Theory (III)	Chapter 13
12	24-Mar	Generating Random Numbers in Python Introduction to Monte Carlo Methods (I)	Notes and Slides, Chapters 21, 22
13	31-Mar	Monte Carlo Simulation (II)	Chapters 23
14	07-Apr	Monte Carlo Simulation (III)	Chapters 24

COURSE SCHEDULE

COMM 3FD3 – Financial Modelling C03 – Monday

Winter 2026 Course Schedule

(subject to changes during the semester)

Week	Lecture Date	Topic Description	Readings
1	05-Jan	Introduction to Financial Modelling Time Value of Money (I)	Chapters 1.1-1.7, 28
2	12-Jan	Time Value of Money (II)	Chapters 1.1-1.7
3	19-Jan	Python Basics, Numpy (I) Firm Valuation (I)	Notes and Slides, Chapters 2 and 3
4	26-Jan	Firm Valuation (II)	Chapter 4
5	02-Feb	Firm Valuation (III)	Chapter 5
6	09-Feb	Bond valuation (I) Python Introduction (II)	Chapters 7.1-7.3, Notes and Slides
7	16-Feb	***Winter Recess***	***No Classes***
8	23-Feb	Bond valuation (II)	Chapters 7.4, 7.6-7.8
9	02-Mar	Working with Data in Python, Pandas Portfolio Theory (I)	Notes and Slides, Chapter 10
10	09-Mar	Portfolio Theory (II)	Chapters 11, 12
11	16-Mar	Portfolio Theory (III)	Chapter 13
12	23-Mar	Generating Random Numbers in Python Introduction to Monte Carlo Methods (I)	Notes and Slides, Chapters 21, 22
13	30-Mar	Monte Carlo Simulation (II)	Chapters 23
14	06-Apr	Monte Carlo Simulation (III)	Chapters 24