Finance 707 - Financial Modeling

Winter 2025 Course Outline

Finance and Business Economics Area

DeGroote School of Business

McMaster University

Instructor and Contact Information

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| --- | --- |
| **C01: Thursday 11:30–14:20** | **CO2: Thursday 14:30-17:20** |
| Class Location: See mosaic for details  | Class Location: See mosaic for details  |
| Instructor**: Dr. Amir Akbari** |
| Email: akbara23@mcmaster.ca |
| Office Hours: Mondays, 10:00 to 11:00 am, or by appointment (DSB 309) |

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| TA:  | **TBA** |  |
| Email:  | **TBA** |  |
| Office Hour: | **TBA** |  |
| Location:  | **TBA** |  |

Course Elements

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

Course Description

This three-credit graduate course provides an introduction to financial modelling with MS-Excel and Python. The main focus is on configuring and solving real-world applications in corporate finance and investments. By the end of this course, students will be able to use quantitative tools (such as spreadsheets and financial libraries/functions) to model problems on topics such as capital budgeting, firm valuation, portfolio management, and risk management.

Learning Outcomes

Upon successful completion of this course, students will be able to complete the following key tasks:

* Develop a conceptual framework to solve financial problems.
* Design a financial model.
* Collect financial and economic data from various data vendors via machine APIs.
* Build a financial model using the Python programming language and MS-Excel.

Students will also gain the basic skills of programming with Python and some of its libraries such as Pandas, Numpy, and SciPy.

Required Course Materials and Readings

|  |  |
| --- | --- |
| Avenue registration for course content, readings and case materials* <http://avenue.mcmaster.ca>
 | $ FREE |
| Benninga; Financial Modeling; Fifth (5th) Edition; The MIT Press, 2022. ISBN: 9780262046428. * Current Price at the bookstore / on Amazon.ca
* Students are allowed to use a second-hand copy of this textbook, or an older edition of it, so long as that edition covers the same chapters covered in this course (consult with the instructor to ensure)
 | $ 133.55 CAD |

Optional Course Materials and Readings

|  |  |
| --- | --- |
| Yves Hilpisch, Python for Finance: Analyze Big Financial Data; 2nd Edition; O'Reilly Media, 2019. ISBN: 978-1492024330. * Current Price at the bookstore / on Amazon.ca
 | $ 99.99 CAD |
| Investment Banking: Valuation, LBOs, M&A, and IPOs Rosenbaum, J., Pearl, J., Investment Banking, Third Edition, Wiley, 2022. ISBN: 978-1119867876. * Current Price at the bookstore / on Amazon.ca
 | $ 114 CAD |

important Links

* [Mosaic](https://epprd.mcmaster.ca/psp/prepprd/?cmd=login)
* [Avenue to Learn](https://avenue.mcmaster.ca/)
* [Student Accessibility Services - Accommodations](https://sas.mcmaster.ca/accommodations/policies-and-procedures/)
* [McMaster University Library](https://library.mcmaster.ca/)

Evaluation

The grade will be calculated as the weighted sum of students’ marks for their FIVE weekly assignments, TWO take-home midterm exams, class participation, and a final exam. The weights and description of each grade component are as follows:

|  |  |  |
| --- | --- | --- |
| Grade Component | Description | Weight |
| Weekly Assignments | Time Value of Money, Capital Budgeting, Python, Risk and Return analysis, Asset Pricing | 5% |
| Midterm 1 | Firm Valuation | 15% |
| Midterm 2 | Portfolio Analysis | 15% |
| Class Participation | Active contributions to weekly discussion | 25% |
| Final Exam | Cumulative and Computer-based (in Python and Excel). Date to be determined | 40% |
| Total |  | **100%** |

**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 |

**Course Deliverables**

## Weekly Assignments

*There are five weekly assignments based on in-class examples. Each assignment has a 1% weight. The details of each assignment will be described at the end of sessions 3,4,5,8, and 11. Students are required to submit their assignments before the start of the next session (i.e. by weeks 4,5,6,9, and 12) on the course portal on the Avenue to Learn website. Students will be graded based on their effort and the quality of the presentation. Late assignments are NOT acceptable.*

## Midterm #1 – Take-home Exam

The first midterm exam has a 15% weight and is a take-home exercise on firm valuation. The details of the exercise will be described in class with at least a two-week notice. Students are required to submit their exams by week 7 on the course portal on Avenue to Learn website. The exam is to be done individually, NOT in collaboration with other students. Students will be graded based on the originality of their work, clarity of presentation and assumptions made (if applicable) and accuracy of the results. Late exams are NOT acceptable.

## Midterm #2 – Take-home Exam

The second midterm exam has a 15% weight and is a take-home exercise on portfolio analysis. The details of the exercise will be described in class with at least a two-week notice. Students are required to submit their exams by week 11 on the course portal on Avenue to Learn website. The exam is to be done individually, NOT in collaboration with other students. Students will be graded based on the originality of their work, clarity of presentation and assumptions made (if applicable) and accuracy of the results. Late exams are NOT acceptable.

## Participation

This class is full of class activities and student participation is an important component of this course. Class participation is graded by the following rubric. Passive attendance does NOT contribute to students’ participation marks.

| **Criteria** | **Excellent 25%** | **Average 10%** | **Unacceptable 4%** |
| --- | --- | --- | --- |
| Verbal Contribution (Comments, Questions, explaining to classmates) | Exhibited all sub-criteria in a respectful manner, in small and large group discussions | Exhibited most of the sub-criteria in a respectful manner, but more so in small than in large groups or vice versa. | Verbalized rarely and only when solicited.  |
| Focus and Attentiveness | Always aware of the topic or issue being discussed, consistently engaged in active listening strategies, and never engaged in activities that distracted others. | Almost always aware of the topic or issue being discussed and often engaged in active listening strategies. May have been distracted once or twice (bad day). | Always distracted or distracting (e.g., on the computer, talking to others, or doing work for other classes). |
| Level of engagement in our class learning community (Discussions, Group Activities, Paired Activities) | Always assumes shared responsibility for the quality of class activities. Advances the class by posting ideas about the readings and course materials. Engages other students in discussions by commenting on classmates’ postings and/or asking for clarification. | Appears to be somewhat indifferent to the topics under discussion. Participates in an aloof way. | Occasionally engages others and/or responds to others in the class. |

## Final Exam

*The final exam will be cumulative, computer-based, and in-person. Students are required to make sure that Python and MS-Excel are running properly on their devices. The date of the final exam is to be set by the registrar’s office.*

Assignments and Take-home midterm exams are introduced in advance, giving students sufficient time to work on them. Therefore, late submissions are NOT acceptable.

Communication and Feedback

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 are encouraged to conduct an informal course review with students by Week #4 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.

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.

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.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at:

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

Students are responsible for being aware of and demonstrating behaviour that is honest and ethical in their academic work. Such behaviour includes:

* following the expectations articulated by instructors for referencing sources of information and for group work;
* asking for clarification of expectations as necessary;
* identifying testing situations that may allow copying;
* preventing their work from being used by others (e.g., protecting access to computer files); and
* adhering to the principles of academic integrity when conducting and reporting research.

Authenticity/Plagiarism Detection

**All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster’s use of Turnitin.com please go to [www.mcmaster.ca/academicintegrity.](http://www.mcmaster.ca/academicintegrity)

Courses with an Online Element

***All courses*** use some online elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, 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, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course.

Students may be required to use the Respondus LockDown Browser and Respondus Monitor. The Respondus LockDown Browser is a downloadable program that allows a student to take an Avenue to Learn quiz in a secure environment. Quizzes can be set to use LockDown Browser or LockDown Browser.

For more details about McMaster’s use of Respondus Lockdown Browser please go to <https://avenuehelp.mcmaster.ca/exec/respondus-lockdown-browser-and-respondus-monitor/>

The available information is dependent on the technology used. Continuation in a course that uses online 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*](https://secretariat.mcmaster.ca/app/uploads/Code-of-Student-Rights-and-Responsibilities.pdf) (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, Teams, 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.

Attendance

Arriving late or missing class disrupts the learning experience for both you and your peers. Punctuality and attendance are crucial to maintaining a respectful, professional and productive environment for everyone, including our faculty.

Instructors may use Top Hat in their course in a variety of ways, including to capture attendance in their classes. Attendance is recorded by submitting a unique 4-digit code displayed in your physical classroom using your personal device.

Missed Academic Work

**Missed Term Work​**

You can apply for relief from missed term work if you have or are going to miss an evaluated portion of your course.​

You can request relief for:​

* Health-related or extenuating circumstances;​
* Representing the University at an academic or varsity event;​
* Religious obligations; or​
* Conflicts between two (or more) overlapping scheduled mid-term exams.​

**Requesting Relief for Missed Term Work​**

If you have missed a portion of your term work for legitimate reasons, as determined by the MFIN Program Office, the weight for that missed term work will be redistributed across the other assignments and exams of the course.​

For missed work, forms and supporting documentation must be submitted to the MFIN Program Office within five (5) business days of missing the work or mid-term exam.​

**Requesting Relief for Term Work in Advance​**

If you know you will miss a portion of evaluated term work, you can request relief/special arrangement in advance. Supporting documentation must be submitted to the MFIN Program Office at least ten (10) working days before the mid-term exam, test, assignment, etc.​

**Supporting Documentation​**

Please complete the [Petition for Missed Term Work](https://mfin.degroote.mcmaster.ca/wp-content/uploads/sites/67/2021/01/MFIN-Petition-for-Relief-for-Missed-Term-Work.pdf) form in addition to:​

* For medical reasons, you must provide the [McMaster University Student Health Certificate](https://mfin.degroote.mcmaster.ca/wp-content/uploads/sites/67/2023/09/student_health_certificate-1-1.pdf) and for extenuating circumstances, appropriate documentation.
* For varsity reasons, have a designated University official provide a letter on University letterhead; or​
* For religious reasons, have your religious leader provide a letter stating that you are unable to be present due to a religious obligation.​

The request must be handled by the MFIN Program Office. The appropriate distribution of re-weighting term work will be determined by the instructor.​

Submitting a request does not guarantee approval or special consideration.​

Academic Accommodation for students with disabilities

Student Accessibility Services (SAS) offers various support services for students with disabilities. Students are required to inform SAS of accommodation needs for course work at the outset of term. Students must forward a copy of such SAS accommodation to the instructor normally, within the first three (3) weeks of classes by setting up an appointment with the instructor. If a student with a disability chooses NOT to take advantage of an SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. The SAS website is:

<http://sas.mcmaster.ca>

***Use of Test Accommodations at McMaster University Burlington Campus Ron Joyce Centre***

Whereas Student Accessibility Services (SAS), on Main Campus, determines all MBA student accommodations, the MBA Faculty Office manages the coordination of accommodations for tests, midterms, and exams at the Ron Joyce Centre in Burlington.

**Process for Students**

* Students must activate their accommodation(s) (e.g., extra-time, memory aid, etc.) for each upcoming test, midterm, or exam, at least two weeks in advance. Students can do this by emailing their Instructor and the DeGroote MBA SAS scheduling office at DSBSAS@mcmaster.ca. If a student cannot meet this deadline, they should contact DSBSAS@mcmaster.ca to discuss alternative arrangements. The program is committed to exploring flexibilities where possible to support students.

* All tests, midterms, and exams are booked synchronously with the class’s start time. Any deviations from the start time (e.g. start earlier than the class to enable completion at the same end time) requires a discussion with their instructor on protocol at the time of accommodation activation.
* Students will leverage the accommodation (e.g., extra-time, memory aid, etc.), in a designated testing room. Rooms will be booked according to the student’s SAS accommodation. Unless the accommodation states otherwise, students should expect that they will be writing in a room with other students. One or more invigilators will always be in the room.
* Following the request to activate the accommodation(s), dsbsas@mcmaster.ca will reach out to the student with their test, midterm, or exam details, including the date, time, and room number. As there may be other students writing tests in the room, we ask that students enter the room quietly and leave all personal items at the front of the room.

All policies and procedures, including restroom access, how extra-time is allocated for assessments under Universal Design, and the submission of memory aids in advance, are consistent with those of SAS on Main Campus. The only variance in procedure is communication around, and physical location of, assessment. There is not a dedicated testing space at RJC. Existing classrooms and lecture halls will be used for most testing. All SAS-approved accommodations will be honoured by our staff; however, core testing elements are not eliminated in alternative testing formats. Students should expect and plan for invigilation, incidental noise, and other potential distractions.

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](https://secretariat.mcmaster.ca/app/uploads/2019/02/Academic-Accommodation-for-Religious-Indigenous-and-Spiritual-Observances-Policy-on.pdf) policy. Students should submit their request to the SEAO (Student Experience Academic Office) ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation. 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 image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

Potential Modification to the Course

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

Research Using Human Subjects

***ONLY IF APPLICABLE***

Research involving human participants is premised on a fundamental moral commitment to advancing human welfare, knowledge, and understanding. As a research intensive institution, McMaster University shares this commitment in its promotion of responsible research. The fundamental imperative of research involving human participation is respect for human dignity and well-being. To this end, the University endorses the ethical principles cited in the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans:

<http://www.pre.ethics.gc.ca>

McMaster University has mandated its Research Ethics Boards to ensure that all research investigations involving human participants are in compliance with the Tri-Council Policy Statement. The University is committed, through its Research Ethics Boards, to assisting the research community in identifying and addressing ethical issues inherent in research, recognizing that all members of the University share a commitment to maintaining the highest possible standards in research involving humans.

If you are conducting original research, it is vital that you behave in an ethical manner. For example, everyone you speak to must be made aware of your reasons for eliciting their responses and consent to providing information. Furthermore, you must ensure everyone understands that participation is entirely voluntary. Please refer to the following website for more information about McMaster University’s research ethics guidelines:

<http://reo.mcmaster.ca/>

Organizations that you are working with are likely to prefer that some information be treated as confidential. Ensure that you clarify the status of all information that you receive from your client. You **MUST** respect this request and cannot present this information in class or communicate it in any form, nor can you discuss it outside your group. Furthermore, you must continue to respect this confidentiality even after the course is over.

Acknowledgement of Course Policies

Your registration and continuous participation (e.g. on A2L, in the classroom, etc.) to the various learning activities of Finance 707 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.

artificial intelligence

Students may use generative AI throughout this course in whatever way enhances their learning; no special documentation or citation is required. However, students are expected to fully understand the output of these models. During the grading process, students might be asked to explain/describe their submitted codes/models.

Incomplete codes/models generate by these technologies (that do not fully deliver to the questions) do NOT receive partial marks.

For additional information and guidelines refer to [Generative Artificial Intelligence - Academic Excellence - Office of the Provost (mcmaster.ca)](https://provost.mcmaster.ca/office-of-the-provost-2/generative-artificial-intelligence-2/)

Course Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Date** | **Topics** | **Readings** | **Due Dates** |
| 1 | 9-Jan | Introduction to Financial modeling (and MS-Excel) | Chapters 28-32 |   |
| 2 | 16-Jan | Python Programming | Teaching Notes |   |
| 3 | 23-Jan | Python Libraries | Teaching Notes |   |
| 4 | 30-Jan | Time Value of Money | Chapters 1, 6 | Assignment 1 |
| 5 | 6-Feb | Project Valuation with DCF | Chapter 2 | Assignment 2 |
| 6 | 13-Feb | Corporate Valuation with Pro Forma Analysis and Multiples | Chapters 4, 5 | Assignment 3 |
|  | 20-Feb | **Midterm recesses (no classes)** |   |   |
| 7 | 27-Feb | Fixed Income Analysis | Chapters 7, 8, 9 | Midterm 1 |
| 8 | 6-Mar | Stock Prices, Return, and Risk Analysis | Chapter 10 |   |
| 9 | 13-Mar | Capital Asset Pricing Models | Chapters 13, 15 | Assignment 4 |
| 10 | 20-Mar | Portfolio Optimization | Chapter 11 and Teaching Notes |   |
| 11 | 27-Mar | WACC and Advanced Risk Metrics (Part I) | Chapter 3 and Teaching Notes | Midterm 2 |
| 12 | 3-Apr | Advanced Risk Metrics (Part II) and Value at Risk | Chapter 25 and Teaching Notes |   |
| 13 | 10-Apr | Monte Carlo Simulation | Chapters 21, 22, 23, 24 | Assignment 5 |

\*The topics covered in each session might be adjusted with the speed of class progress.