COMMERCE 4FF3
Portfolio Theory and Management
Fall 2023 Course Outline

DeGroote School of Business
McMaster University

COURSE OBJECTIVE

The course offers an advanced treatment of investment decision making. It explains in a formal and systematic fashion those concepts underlying portfolio investment decisions under risk. By using portfolio selection models, it also seeks to provide intuitive appealing criteria for such decisions. Besides covering recent research advancements in portfolio theory, the course has its emphasis on various practical and institutional issues pertaining to portfolio management as well.

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Dr. Andrew Aziz, Chief Strategy Officer & Head of Product, SS&C Algorithmics; Telephone: 437-991-1876; e-mail: andyaziz@rogers.com.

The teaching assistant's contact information and office hours are to be announced in class.

Important Notice: For e-mail communications with the instructor or the teaching assistant, please always use "**Commerce 4FF3**" for the subject heading.

COURSE ELEMENTS

Credit Value:	3	Leadership:	No	IT skills:	No	Global view:	Yes
Avenue:	Yes	Ethics:	Yes	Numeracy:	Yes	Written skills:	Yes
Participation:	Yes	Innovation:	Yes	Group work:	Yes	Oral skills:	No
Evidence-based:	Yes	Experiential:	No	Final Exam:	Yes		

Algebra and general analytical skills, including those pertaining to matrix algebra, as well as fundamental statistical concepts, are important course elements.

COURSE DESCRIPTION

The course starts with some basic portfolio concepts. The coverage starts with a brief review of utility theory. It then provides alternative justifications for the mean-variance approach. If neither justification is considered adequate, a simple remedy is also provided and justified.

Once the fundamental materials have been covered, the analysis begins with two-security and three-security illustrations. With equally weighted portfolios being an example, more portfolio concepts are introduced. The course then presents, in considerable detail, portfolio selection under a simplifying assumption of short sales. The assumption allows efficient allocations of investment funds to be determined directly and analytical properties of the portfolio solution to be explored.

Various empirical and analytical issues pertaining to the sample covariance matrix of security returns are considered. To complement the analytical materials involved, spreadsheet-based illustrations are provided as well.

Considered next is portfolio analysis in the presence of a risk-free security. The analysis now becomes a two-part process. The first part pertains to the determination of the optimal risky portfolio regardless of any specific risk-return preferences of the investors involved. The second part pertains to the allocation of investment funds between the risk-free security and the optimal risky portfolio. It is the second part that knowledge about the investors' risk-return preferences is required. The course then examines some analytical issues and introduces a more realistic assumption about short sales.

The course then considers portfolio selection with short sales disallowed. An algorithm for portfolio construction, called the critical line method as developed by Harry Markowitz, a 1990 Nobel Laureate, is presented. Also considered is a simpler, but analytically equivalent, version of the algorithm, as well as a numerical approach for solving directly the same portfolio selection problem with spreadsheet tools on computers.

In order to establish some intuitive appealing criteria for portfolio selection, the covariance structure of security returns is then characterized by various models. The constant correlation model is the simplest among these models. It characterizes the correlations of returns of all securities considered to be the same. The single index model considers individual security returns as driven by the return of a market index; it uses the beta coefficients of individual securities to capture their relevant risk in a portfolio context. These models are then extended to account for group effects (such as industrial effects) on the portfolio choice.

Equilibrium models, including the well-known capital asset pricing model (CAPM) and the lesser known Arbitrage Pricing Theory (APT) are then described in detail. If investors behave as portfolio theory suggests they should, then their actions can be aggregated to determine prices at which securities will sell in the market.

LEARNING OUTCOMES

Upon successful completion of the course, the student will have a solid foundation in modern portfolio theory and good understanding of portfolio management in practice. As the use of spreadsheet tools is an important course element, the student will also have acquired some practical spreadsheet skills.

COURSE MATERIALS AND READINGS

The required course material is contained in the following textbook:

Modern Portfolio Theory and Investment Analysis 9th Edition, E. *Elton, M. Gruber, S. Brown & W. Goetzmann,* 2014.

The textbook is available as an ebook..

COURSE OVERVIEW AND ASSESSMENT

There are three components for evaluation

Components and Weights

Final	**45%**
Mid Term	**25%**
Assignments (4)	**30%**

NOTE: The use of a McMaster standard calculator is allowed during examinations in this course. See McMaster calculator policy at the following URL:

www.mcmaster.ca/policy/Students-AcademicStudies/UndergraduateExaminationsPolicy.pdf

COURSE DELIVERABLES

Assignments
There will be **4** group assignments, each worth **7.5%** of your final grade totaling **30%** in aggregate. Groups will be self-formed and can be comprised of up to **5** members

Midterm
There will be **one** *in class* midterm examination in this course that accounts for **25%** of your grade. Content will cover roughly the first **50%** of the course material

Final Exam
There will be **one** *in class* final examination in this course that accounts for **45%** of your grade. It will be cumulative with content covering roughly **25%** of course material prior to the midterm and **75%** of course material after the midterm

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. All students must receive feedback regarding their progress prior to the final date by which a student may cancel the course without failure by default.

- *For Level 1 and Level 2 courses, this feedback must equal a minimum of 20% of the final grade.*
- *For Level 3 courses and above, this feedback must equal a minimum of 10% of the final grade.*

Instructors may solicit feedback via an informal course review with students by Week #4 to allow time for modifications in curriculum delivery.

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/

GENERATIVE AI

Students are not permitted to use generative AI 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 state in the policy is the following, "Contract Cheating is the act of "outsourcing of student work to third parties" (Lancaster & Clarke, 2016, p. 639) 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.

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.

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.

AUTHENTICITY/PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g.

Avenue to Learn, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **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.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn, 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. 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.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

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 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 image 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, Avenue to Learn and/or McMaster email.

ACKNOWLEDGEMENT OF COURSE POLICIES

Your enrolment in Commerce 4FF3 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

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WEEK	DATE	ASSIGNMENT
1	Sept. 11	Introduction and preliminary concepts: Readings: - Elton & Gruber: Chapters 1, 2, 3.
2	Sept. 18	Portfolio Risk and Return - Mean-Variance Approach: Readings: - Elton & Gruber: Chapters 4, 5. 11
3	Sept. 25	Portfolio Selection with Frictionless Short Sales Readings: - Elton & Gruber: Chapters 4, 5
4	Oct. 02	Portfolio Selection in the Presence of a Risk-Free Security Readings: - Elton & Gruber: Chapters 5, 6

5	Oct. 09	Reading Week
6	Oct. 16	Portfolio Selection without Short Sales Readings: - Elton & Gruber: Chapters 6
7	Oct. 23	Midterm
8	Oct. 30	Practical issues implementing Portfolio Selection Readings: - Elton & Gruber: Chapters 6
9	Nov. 06	Constant Correlation Model Readings: - Elton & Gruber: Chapters 7, 9
10	Nov. 13	Index Models Readings: - Elton & Gruber: Chapters 7, 9
11	Nov. 20	Equilibrium models: CAPM Readings: - Elton & Gruber: Chapters 13, 14
12	Nov. 27	Equilibrium models: APT Readings: - Elton & Gruber: Chapter 16
13	Dec. 04	Current practice - TBD