



## PPHA 42525 FINANCIAL RISK MANAGEMENT TOOLS

DRAFT SYLLABUS

Fall 2023

**Professor:** Thomas Coleman, [tcoleman@uchicago.edu](mailto:tcoleman@uchicago.edu)  
Office hour: TBD

**TAs:**  
Dan Shen

**Lecture time** (room 2054):  
Tuesday & Thursday 2:00-3:20pm

**TA sessions:**  
TBD

### COURSE SUMMARY

This course will investigate tools for firm-level financial risk management.

The focus will be on practical risk management for trading in financial markets – the tools and techniques traders and managers use to measure and manage market risk: Volatility, VaR, Contribution to Risk, Best Hedges, and Replicating Portfolios. The seminar will be built around the sample portfolio and risk reporting in Chapter 10 of *Quantitative Risk Management*. Students will be required to translate from Mathematica into python the code for producing the risk reports. This will provide students with practical training in python coding and a deeper understanding of the ideas and quantitative foundations of financial risk reporting.

This course will be a small hands-on seminar focused on the tools and techniques traders and managers use to measure and manage market risk: Volatility, VaR, Contribution to Risk, Best Hedges, and Replicating Portfolios. The seminar will be built around the sample portfolio and risk reporting in Chapter 10 of my book *Quantitative Risk Management*. Students will be required to translate from Mathematica into python the code for producing the risk reports. This will provide students with practical training in python coding. We will also cover the financial theory behind the risk measures, to gain a deeper understanding of the ideas and quantitative foundations of financial risk reporting. Students must have already taken my “Applied Financial Management” and students must apply to take the course.

### COURSE STRUCTURE

This will be a small seminar-style course. We will have between 9 and 12 students, and you will split into teams of 3. The task for the course, should you accept it, is to translate my original Mathematica code into python. The course goals are:

- To learn about risk measurement tools such as Value at Risk, contribution to risk, best hedges, replicating portfolios
- To sharpen you python coding skills through a practical and useful project
- To have a working risk management package that you can use for learning and testing risk measurement ideas

This is the first time I am teaching this course, and we will explore together the best way for you to learn about these risk tools. We have two classes each week. I plan to use one lecture for teaching about the theory and algorithms for tools such as VaR and contribution to risk, and the other for discussion and student presentation on coding the sample portfolio and risk tools.

## TEXTBOOKS, SOFTWARE:

### TEXT:

- We will focus on the sample portfolio and the risk reports covered in Chapter 10 of my book *Quantitative Risk Management*. You are not required to buy the book, although I think it will be valuable for you.
  - Available on Amazon as hard-copy and Kindle: [https://www.amazon.com/Quantitative-Risk-Management-Website-Practical/dp/1118026586/ref=sr\\_1\\_4](https://www.amazon.com/Quantitative-Risk-Management-Website-Practical/dp/1118026586/ref=sr_1_4)
- Here are the other options you have (instead of buying the book):
  - I will post a copy of Chapter 10 on Canvas
  - You can find chapters 1-4 on “thinking about risk” in the CFA monograph *A Practical Guide to Risk Management* available as Kindle ([https://www.amazon.com/Practical-Guide-Risk-Management/dp/1934667412/ref=sr\\_1\\_1](https://www.amazon.com/Practical-Guide-Risk-Management/dp/1934667412/ref=sr_1_1)) or as PDF (<https://rpc.cfainstitute.org/en/research/foundation/2011/a-practical-guide-to-risk-management>)

### SOFTWARE:

- You will need to work with both *Mathematica* and Python.
- MATHEMATICA
  - This is a commercial product but the university has a site license – as a student you will have access
  - This link has directions for downloading and activation: [https://uchicago.service-now.com/it?id=kb\\_article&kb=KB00015443](https://uchicago.service-now.com/it?id=kb_article&kb=KB00015443)
  - I originally wrote my code for the sample portfolio in Mathematica. Your task is to translate the code for risk reports from Mathematica to python.
- PYTHON
  - You will need a working installation of python.
  - Install using Anaconda.
  - We will be using both Jupyter Notebooks and the Spyder Integrated Development Environment (IDE).
  - If you do not know how to use it, learn to use the interactive debugger in Spyder
- GITHUB
  - You will need a GitHub account
  - I will post the Mathematica code, and update your various python versions, using a (private) git on GitHub

## **Diversity and Inclusion**

The Harris School welcomes, values, and respects students, faculty, and staff from a wide range of backgrounds and experiences, and we believe that rigorous inquiry and effective public policy problem-solving requires the expression and understanding of diverse viewpoints, experiences, and traditions. The University and the Harris School have developed distinct but overlapping principles and guidelines to ensure that we remain a place where difficult issues are discussed with kindness and respect for all.

The University's policies are available below. Specifically, the University identifies the freedom of expression as being "vital to our shared goal of the pursuit of knowledge, as is the right of all members of the community to explore new ideas and learn from one another. To preserve an environment of spirited and open debate, we should all have the opportunity to contribute to intellectual exchanges and participate fully in the life of the University."

The Harris School's commitments to lively, principled, and respectful engagement are available below: "Consistent with the University of Chicago's commitment to open discourse and free expression, Harris encourages members of the leadership, faculty, student body, and administrative staff to respect and engage with others of differing backgrounds or perspectives, even when the ideas or insights shared may be viewed as unpopular or controversial." We foster thought-provoking discourse by encouraging community members not only to speak freely about all issues but also to listen carefully and respectfully to the views of others.

University policies: <https://studentmanual.uchicago.edu/university-policies/>

Harris policies: <https://harris.uchicago.edu/about/who-we-are/diversity-inclusion>

## **Title IX Reporting Responsibilities**

Your instructor and TAs for this class are designated as "responsible employees" under the US law known as Title IX. We have a duty to report incidents of sexual harassment, including sexual violence, domestic violence, dating violence, and stalking, or other misconduct to appropriate school officials.

## **Academic Integrity (aka Cheating)**

This is a large and important class for your education here at Harris. We take academic integrity very seriously, and although we have the highest confidence in you as students, we must also remind you that academic integrity and honesty are central to our mission as a school and to each of us as instructors, TAs, and students.

All University of Chicago students are expected to uphold the highest standards of academic integrity and honesty. Among other things, this means that students shall not represent another's work as their own, use un-allowed materials during exams, or otherwise gain unfair academic advantage. From the University's policy (link below): "It is contrary to justice, academic integrity, and to the spirit of intellectual inquiry to submit another's statements or ideas as one's own work. To do so is plagiarism or cheating, offenses punishable under the University's disciplinary system. Because these offenses undercut the distinctive moral and intellectual character of the University, we take them very seriously."

The Harris School's policies are available in the Harris Student Handbook Canvas site. All students suspected of academic dishonesty will be reported to the Harris Dean of Students for investigation and adjudication. The disciplinary process can result in sanctions up to and including suspension or expulsion from the University. In addition to disciplinary sanctions, we reserve the right to impose other sanctions,

up a failing grade for the course for students who have committed academic dishonesty, regardless of performance on elements of the course.

University policies: <https://studentmanual.uchicago.edu/academic-policies/academic-honesty-plagiarism/>

Note, of course, that for problem sets we are asking you to work in groups, and so *in this course* (but not necessarily other courses at Harris) collaborating on problem sets *is not* considered academic dishonesty – we are asking you to collaborate. We do require, however, that each group write up and hand in their own solution and put the group members on the solution set. This is as much for your own benefit as it is for ours – you need to work on the problems and understand the problems if you want to pass the midterm and final, and later classes here at Harris.

## **Disability Accommodations**

The University’s policies regarding students with disabilities are available below. Students who have disability accommodations awarded by the University Student Disability Services Office should inform the Harris Dean of Students office by the end of the first week of class. The Harris Dean of Students Office will work with the student and instructor to coordinate the students’ accommodations implementation.

Harris students are not required to submit their accommodations letter to the instructor. Students from other divisions in the University must submit their accommodations letter to either the instructor or the Harris Dean of Students Office—we recommend submitting it to the Dean of Students office for fastest reply.

Students who do not yet have formal accommodations in place but who feel they need accommodations on a temporary or ongoing basis should contact the Harris Dean of Students Office or Student Disability Services.

University policies: <https://studentmanual.uchicago.edu/university-policies/disability-accommodations/>

## **Student Mental Health and Other Support**

If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, remote counseling services are available. Student Counseling Service (SCS) urges you to attend to your mental wellbeing and to reach out to them for support during these challenging times. All SCS services are covered by the Student Life Fee, and there is no additional cost for students to access their services. See <https://wellness.uchicago.edu/mental-health/student-counseling-service-spring-quarter-faq/>. Students seeking new services/resources can call 773.702.9800 during business hours (Monday–Friday 8:30 a.m.–5 p.m.) and ask to speak with a clinician. Students needing urgent mental health care can speak with clinicians over the phone 24/7 by calling the SCS at 773.702.3625.

The Harris School itself provides both academic and non-academic support services for students. These resources are described (and links provided) via the Canvas site Harris Student Handbook, which all Harris instructors can access.

## **University of Chicago Policy on Lecture Recordings**

By attending course sessions, students acknowledge that:

1. They will not: (i) record, share, or disseminate University of Chicago course sessions, videos, transcripts, audio, or chats; (ii) retain such materials after the end of the course; or (iii) use such materials for any purpose other than in connection with participation in the course.
2. They will not share links to University of Chicago course sessions with any persons not authorized to be in the course session. Sharing course materials with persons authorized to be in the relevant course is permitted. Syllabi, handouts, slides, and other documents may be shared at the discretion of the instructor.
3. Course recordings, content, and materials may be covered by copyrights held by the University, the instructor, or third parties. Any unauthorized use of such recordings or course materials may violate such copyrights.
4. Any violation of this policy will be referred to the Area Dean of Students.