

Quantitative Finance
Course Number: 22:839:670
Course Title: Risk Management

COURSE DESCRIPTION

This course provides an overview of financial risk management. Emphasis will be on modeling and quantitative techniques. Students will learn how risk management is carried out in today's financial firms and about current challenges in financial risk management.

COURSE MATERIALS

1. McNeil, A., Frey, R., Embrechts, P. (2015) *Quantitative Risk Management: Concepts, Techniques, and Tools*, Princeton University Press.
2. Hull, J. (2018) *Risk Management and Financial Institutions*, Wiley Finance), 5th Edition.
3. Jorion, P. (2007) *Value at Risk: the new benchmark for managing financial risk*, McGraww-Hill, 3rd edition.

LEARNING GOALS AND OBJECTIVES

We will introduce statistical techniques used for deriving the profit-and-loss distribution for a portfolio of financial instruments and to compute risk measures associated with this distribution. The focus lies on the mathematical/statistical modeling of market- and credit risk. Operational risks and the use of financial time series for risk modeling are not considered. Financial institutions typically hold portfolios consisting on large number of financial instruments. A careful modeling of the dependence between these instruments is crucial for good risk management in these situations. A large part of the class is therefore devoted to the issue of dependence modeling.

ACADEMIC INTEGRITY

I do NOT tolerate cheating. Students are responsible for understanding the RU Academic Integrity Policy (<http://academicintegrity.rutgers.edu/>). I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, "On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment." [I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work.] Don't let cheating or plagiarism destroy your hard-earned opportunity to learn and advance. See business.rutgers.edu/ai for more details.

Guidance on the use of AI at Rutgers

As noted in [Rutgers Academic Integrity Policy 10.2.13](#), the principles of academic integrity require that students make sure that all submitted coursework be “the student’s own and created without the aid of impermissible technologies, materials, or collaborations.”

ATTENDANCE AND PARTICIPATION

There is a strong relationship between attendance/active participation and grades.

Students will be responsible for all work missed during an absence, no matter what the reason for the absence.

The University is committed to a culture of academic engagement between students and faculty. Part of this commitment involves taking responsibility for attending your classes, workshops and exams, and informing your instructors when you cannot attend.

If you are absent from a class or exam for any reason, please **email the instructor**.

All students are expected to bring a positive attitude to the classroom, and to respect the learning environment. This means, at a minimum, that no student will disrupt the learning environment, even in small ways, which includes sending or receiving text messages, or surfing the internet, or tweeting, or talking to other students about anything unrelated to the subject matter at hand. So, **PLEASE NO CELL PHONES, COMPUTERS or OTHER ELECTRONIC DEVICES IN CLASS** unless you are asked to use them.

Please notice that office hour time is reserved for students who have attended class; it is not for giving private classes to students who did not attend at the scheduled time, however good their reasons.

I understand that you might have to miss a class or two during the semester. In this case, you are encouraged to obtain class notes from your peers, read the textbook and come to office hours to clarify any topics you have difficulty with. **If you miss three or more classes, the instructor reserves a right to lower your course grade by one letter grade.**

Late arrivals and earlier departures are considered as a missed class.

Participation

You are expected to actively participate in the course. This participation can consist of in-class discussions and visits to office hours.

The most active participants will get a bonus at the end of the course.

Time commitment

This is a challenging course.

Mastering the material of this course requires time. I would estimate that successful students should spend at least 7 hours per week to review the material and solve problems, and more than that before major exams.

... There have been many studies of elite performers - concert violinists, chess grand masters, professional ice-skaters, mathematicians, and so forth - and the biggest difference researchers find between them and lesser performers is the amount of deliberate practice they've accumulated. Indeed, the most important talent may be the talent for practice itself.
Gawande A., "The Learning Curve", *The New Yorker*,
January 28, 2002, p.52-61.

I want you to do well in this class. Your approach should be learning concepts thoroughly and practising with a variety of problems. You are warmly invited to ask questions in class and in office hours. Feel free to let me know if you have any problems with the class and express your concerns during the semester. Your feedback is always welcome!

CAUTION: The information in this syllabus is subject to change, as announced in class or via email/Canvas. No major changes are anticipated, but you are expected to attend class and check email regularly.

GRADING POLICY

There are following graded items in this course:

- Active class participation;
- Homework;
- Project;
- Final Exam.

You will receive a separate score for each of the items. The final grade will be a weighted average of these items using the weighting scheme indicated below.

- Grading distribution:

Participation in class	...	5%
Homework	...	15%

Project	...	35%
Final Exam	...	45%

- Homework problems will be graded "on completion". They should be solved regularly and kept in an organized way. All coding problems have to be submitted via Assignments on Canvas. All students may be asked to explain their solutions at any time during the semester.

No late homework will be accepted for any reasons, but the lowest grade will be dropped at the end of the course.

You can discuss assignment problems with your classmates, however you MUST write the code yourself. In case when instructor suspects that the code was copied, you may be asked to explain in detail what your program does and how it operates. You should also be able to write a code for the same problem from scratch. In case when cheating on homework is confirmed, the student will receive a score of 0 for the whole portion of homework grade for the semester, not just for one set.

- The Final Exam (cumulative) will be held, during regular class hours. The format of the exam is closed-book. You can bring one piece of paper (letter size, 1-sided) with hand-written formulas. Please only bring pencils, pens, erasers, a standard calculators (with the basic functions; not programmable and/or cell phone), and your Rutgers ID card with you to the exam. All course materials will be relevant for the final exam. There will be no make-up final exam. You will receive a score of zero if you miss the exam.

You need to score at least 40% on the Final Exam to pass the course.

There are no opportunities for extra credit except the ones provided in class during the semester and regular exams.

	Weighted average of graded items	Corresponding grade
• Grade allocation:	[92, + ∞)	A
	[90, 92)	A-
	[84, 90)	B+
	[76, 84)	B
	[70, 76)	B-
	[64, 70)	C+
	[56, 64)	C
	[50, 56)	C-
	[40, 50)	D
	[0, 40)	F

- All (partial) scores received throughout the course will be added to the *Gradebook* on the Canvas course website.
- Your partial scores/final grades are not subject to negotiation. If you feel I have made an error, submit your written argument to me within one week of receiving your grade/score. Clarify

the precise error I made and provide all supporting documentation. If I have made an error, I will gladly correct it. But I will adjust grades only if I have made an error.

COURSE SCHEDULE

The course follows the Rutgers Academic Calendar

SUPPORT SERVICES

If you need accommodation for a **disability**, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at ods.rutgers.edu.

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email dsoffice@echo.rutgers.edu]

[Rutgers University-Newark ODS phone (973)353-5375 or email ods@newark.rutgers.edu]

If you are **pregnant**, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email jackie.moran@rutgers.edu]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email TitleIX@newark.rutgers.edu]

If you seek **religious accommodations**, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email deanofstudents@echo.rutgers.edu]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email DeanofStudents@newark.rutgers.edu]

If you have experienced any form of **gender or sex-based discrimination or harassment**, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at <http://vpva.rutgers.edu/>.

[Rutgers University-New Brunswick incident report link:

<http://studentconduct.rutgers.edu/concern/>. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link:

https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7 . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at

TitleIX@newark.rutgers.edu. If you wish to speak with a staff member who is confidential and

does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email run.vpva@rutgers.edu]

Bias incidents: an act – either verbal, written, physical, or psychological that threatens or harms a person or group on the basis of actual or perceived race, religion, color, sex, age, sexual orientation, gender identity or expression, national origin, ancestry, disability, marital status, civil union status, domestic partnership status, atypical heredity or cellular blood trait, military service or veteran status.

Bias incidents can be reported online at:

[New Brunswick Bias Incident Report Form](#)

[Newark Bias Incident Report Form](#)

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via

<https://temporaryconditions.rutgers.edu> .

If you are a military **veteran** or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of **mental health** services, please use our readily available services.

[Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>]

[Rutgers Counseling and Psychological Services–New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of **physical health** services, please use our readily available services.

[Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>]

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of **legal** services, please use our readily available services:

<http://rusls.rutgers.edu/>

Students experiencing difficulty in courses due to **English as a second language (ESL)** should contact the Program in American Language Studies for supports.

[Rutgers–Newark: PALS@newark.rutgers.edu]

[Rutgers–New Brunswick: eslpals@english.rutgers.edu]

If you are in need of additional **academic assistance**, please use our readily available services.

[Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rlc>

[Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>]

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>]

[Optional items that many faculty include:

- Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

- Students must sign, date, and return a statement declaring that they understand this syllabus.]

CODE OF PROFESSIONAL CONDUCT

[If you prefer to direct students to the conduct policy online instead, please use the following link and place it beneath the header above:

<https://myrbs.business.rutgers.edu/students/code-professional-conduct>]

Rutgers Business School is recognized for its high-quality education. To that end, maintaining the caliber of classroom excellence, whether in person or online, requires students to adhere to the same behaviors expected in professional career environments. These include the following principles:

Discussion and Correspondence

- Each student is encouraged to participate actively in class discussions and exercises. Substantive dialogue requires a degree of mutual respect, willingness to listen, and tolerance of opposing points of view. Disagreement and the challenging of ideas must happen in a supportive and sensitive manner. Hostility and disrespectful behavior will not be tolerated.
- In correspondence and in the classroom, students should demonstrate respect in how they address instructors. Students should use proper titles unless there is an explicit understanding that the instructor accepts less formal alternatives. Similarly, appropriate formatting in electronic communication and timely responsiveness are all expectations in every professional interaction, including with instructors. Everything said and written should demonstrate respect and goodwill.

Punctuality and Disruption

- Class starts and ends promptly at the assigned periods. Students are expected to be in their seats or present online and ready to begin class on time.
 - Take your responsibility to attend class seriously. Your attendance is a critical element of the learning experience for in-person classes. Failure to show up disrupts your learning and signals disrespect to your peers and instructors. (Of course, illness is a legitimate exception requiring advanced reporting to the [University](#) and your instructors.)
 - Barring emergencies and within reason, students are expected to remain in their seats for the class duration. In person, packing belongings before the end of class disturbs both other students and the instructor. Online, attending to other tasks is distracting. In addition, even if webcams are not required in your course, your attention is fundamentally lacking if you are engaged in multiple tasks simultaneously.

Technology

- The use of technology is sanctioned only as permitted by the course instructor. As research on learning shows, peripheral use of technology in classes negatively impacts the learning environment in three ways:
 1. Individual learning and performance directly suffer, resulting in the systemic lowering of grades earned.
 2. In the classroom, one student's use of technology automatically diverts and captures other people's attention, thus impeding their learning and performance. Moreover, even minor infractions have a spillover effect and result in others doing the same.
 3. Subverting this policy (e.g., using a phone during class, even if hidden below the table or out of sight from your webcam; tapping on a smartwatch; using a laptop for non-course related matters) is evident to the course instructor and offensive to the principles of decorum in a learning environment.
- Networking, computing, and associated resources in the trading rooms, advanced technology rooms, and general classrooms are to be used in the manner intended.
- Sharing links to private online classes, attempting to join an online class you are not enrolled in, or posting disruptive content during these sessions are strictly prohibited and may lead to disciplinary action.
- For more instructions on information technology resources at Rutgers University, please refer to the [Acceptable Use Policy for Information Technology Resources](#).

Misappropriating Intellectual Property

- Almost all original work is the intellectual property of its authors. These works may include syllabi, lecture slides, recorded lectures, homework problems, exams, and other materials, in either printed or electronic form. The authors may hold copyrights in these works, which U.S. statutes protect. Copying this work or posting it online (on sites such as Chegg or Course Hero) without the author's permission may violate the author's rights. More importantly, these works are the product of the author's efforts; respect for these efforts and the author's intellectual property rights are important values that members of the university community take seriously.
- For more instructions on copyright protections at Rutgers University, please refer to the [Rutgers Libraries](#).

Rutgers Business School is committed to the highest standards of integrity. We value mutual respect and responsibility, as these are fundamental to our educational excellence inside and outside the classroom.