University of Minnesota
College of Science & Engineering
FM 5031/2 Practitioner Sequence
Module: Quantitative Risk Management (5+5 weeks)

Instructor: John Dodson

DRAFT January 23, 2019

This course is part of the Masters in Financial Mathematics (MFM) program required practitioner sequence. The objective of this course is to provide students with a grounding in applied probability theory and statistics as it relates to the measurement of financial risk.

Sessions

There will be weekly class sessions for five weeks during Fall semester and five weeks during Spring semester.

Class sessions are scheduled for Wednesdays from 5:30 PM to 8:50 PM with a break at 7:00 PM. For fall term, we meet in Appleby Hall 219. For spring term, we meet in Tate Hall 110.

Your instructor lives out of state. For some sessions, the instructor will be hosting remotely via the University's Cisco WebEx™ service.

`https://umn.webex.com/join/dodso013`

The teaching assistant will be on-site during these sessions.

Resources

The instructor will hold office hours on Sundays from 7:00 PM to 9:00 PM by WebEx. You may make alternate arrangements by contacting the instructor. You may contact the instructor at

`mailto:jdodson@math.umn.edu`

The class website is

http://www-users.math.umn.edu/~dodso013/fm503/

I will post slides in advance. I recommend you use the slides to take notes during the classroom session. The latest version of this document can also be found there.

Grades and feedback will be available at the Canvas learning management system

Fall https://canvas.umn.edu/courses/74890

Spr https://canvas.umn.edu/courses/99172

The instructor and teaching assistant will moderate online discussions about assignment through the Piazza page at

https://piazza.com/umn/fall2018/fm50315032/home

Rather than emailing questions about assignments, I encourage you to post your questions on Piazza.

Scientific Computing

Some of the assignments will require scientific computing to solve. Software that facilitates interactive scientific computing include MATLAB™, Mathematica™, R, Python, and Julia. I expect you to be familiar with at least one of these. Demonstrations and solutions that I present will use Julia.

https://julialang.org/

Teaching Assistant

Our teaching assistant is PA Nguyen (nguy2027).

For the fall term, PA will hold office hours Mondays from 4:00 PM to 5:30 PM in ME 109. For spring term, Fridays 2:30 PM to 4 PM in Shepherd 406

Texts

The main text for the course is

QRM: *Quantitative Risk Management, Concepts, Techniques, and Tools (Revised Edition)*, by Alexander McNeil, Rüdieger Frey, and Paul Embrechts; published by Princeton University Press, ISBN 978-0-691-16627-8.

https://press.princeton.edu/titles/10496.html

also available in the University Bookstore.

In addition to the required text, the text(s) below may be useful supplements:

- *Analysis of Financial Time Series, 3rd ed.*, by Ruey Tsay; published by Wiley, ISBN 978-0-470-41435-4.

Schedule

Please complete the scheduled reading before each class session.

FM 5031/2 module

Date	Subject	Reading
Wed 5 Sep	basic concepts in risk management	QRM I.2
Wed 12 Sep	empirical properties of financial data	QRM I.3
Wed 19 Sep	likelihood inference	QRM A.3
Wed 26 Sep	financial time series	QRM II.4
Wed 3 Oct	extreme value theory	QRM II.5
Wed 23 Jan	multivariate models	QRM II.6
Wed 30 Jan	copulas and dependence	QRM II.7
Wed 06 Feb	aggregate risk	QRM II.8
Wed 13 Feb	credit risk	QRM III.10
Wed 20 Feb	market risk	QRM III.9

Evaluation

Grading will be based on three evaluation sources each semester: weekly in-class short quizzes (10%), regular weekly homework (40%), and a larger assignment, which may be a group project, due one week after the last session (50%).

Attendance is required to earn quiz points; but a single lowest-scored quiz each semester will not count towards the total to provide some accommodation for absences.

Grading

Module grading is A–D with $\pm$ (except $A+$), according to the University's definitions:

$A \leftarrow 4$ Achievement that is outstanding relative to the level necessary to meet course requirements.

$B \leftarrow 3$ Achievement that is significantly above the level necessary to meet course requirements.

$C \leftarrow 2$ Achievement that meets the course requirements in every respect.

$D \leftarrow 1$ Achievement that is worthy of credit even though it fails to meet fully the course requirements.

$F \leftarrow 0$ Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit, or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

$I \leftarrow \emptyset$ The incomplete shall be assigned at the discretion of the instructor when, due to extraordinary circumstances, the student was prevented from completing the work of the course on time. The assignment of an I for the sequence requires a written agreement between the affected instructors, the program management, and the student specifying the time and manner in which the student will complete the course requirements.

Grades for FM 5031–2 modules are averaged at weights according to the number of weeks for each section. This module's weight is $\frac{5}{15}$ for FM 5031 and FM 5032 aggregated according to the scheme described at

`http://archive.math.umn.edu/finmath/courses/grading.shtml`

Academic integrity

Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else's work as your own, can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:

> *Scholastic dishonesty* means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.
>
> Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an F or N for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

Instructor Policies

Extra credit

The instructor will not accept any work for extra credit.

University Policies

Inquiries regarding any changes of grade should be directed to the instructor of the course; you may wish to contact the Student Conflict Resolution Center (SCRC) in 254 Appleby Hall (624-7272) for assistance (10 Church Street SE, room 310, for the fall 2018 semester). The Student Conflict Resolution Center website is

http://www.sos.umn.edu/

University policy prohibits sexual harassment as defined in the October 2017 Board of Regents policy statement, available at the Office of Equal Opportunity and Affirmative Action. Questions or concerns about sexual harassment should be directed to this office, located at 274 McNamara Alumni Center. Further guidance is available at

https://policy.umn.edu/hr/sexharassassault

The Board of Regent's academic policies are available at

https://regents.umn.edu/policies/index

The Office for Community Standards website is

https://communitystandards.umn.edu/

which includes guidelines around academic dishonesty.

The University of Minnesota is committed to providing all students equal access to learning opportunities. The Disability Resource Center (DRC) works with students who have disabilities to provide and/or arrange reasonable accommodations.

- Students who have, or think they may have, a disability (e.g. mental health, attentional, learning, vision, hearing, physical or systemic), are invited to contact the DRC to arrange a confidential discussion at 612-626-1333 (V/TTY) or mailto:drc@umn.edu.
- Students registered with DRC, who have a letter requesting accommodations, are encouraged to contact the instructor early in the semester to discuss accommodations outlined in their letter.

Additional information is available at

https://diversity.umn.edu/disability