

University of Minnesota Institute of Technology
FM 5031/2 Practitioner Sequence (4 cr.)
Module: Data Analysis, Simulation, and Portfolio Optimization

Instructor: John A. Dodson*

DRAFT September 9, 2007

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 statistics as it relates to finance, with an emphasis on simulation techniques for valuation and risk measurement and decision techniques for portfolio design.

Sessions

There will be weekly class sessions for seven weeks during Fall semester (5 September to 17 October) and seven weeks during Spring semester (23 January to 5 March).

We will hold class sessions in the IT Lab in Lind Hall 024¹ from 5:00 PM to 8:20 PM on Wednesdays, with a break at 6:30 PM to accommodate other instructors' office hours.

Note, there is no eating or drinking allowed in the IT Lab.

Resources

The instructor will hold office hours on Tuesdays from 6:00 PM to 8:00 PM in Vincent Hall 262.

You may contact the instructor by e-mailing to

`jdodson@math.umn.edu`

The class web log is

`http://blog.lib.umn.edu/dodso013/finmath/`

I encourage you to check this regularly for posts. You may want to subscribe to the site's RSS feed; alternatively, please contact me if you wish to have an e-mail address added to the site's notification list.

The course will make heavy use of the MATLAB[®] system by The MathWorks Inc. A useful site for documentation and public libraries for MATLAB[®] is

`http://www.mathworks.com/matlabcentral/`

*RiverSource Investments LLC, an Ameriprise Financial company

¹We may also use the lecture hall in Ford Hall 127

Texts

The main text for the course is

M: *Risk and Asset Allocation*, by Attilio Meucci, published by Springer-Verlag

The author maintains a website for this text at

<http://www.symmys.com/>

The other required text is

CW: *Simulation Techniques in Financial Risk Management*, by Ngai Hang Chan and Hoi Ying Wong, published by Wiley-Interscience

We will only be using this text in the Fall.

Recommended texts

In addition to the two required texts, these may be useful supplements –

- *Probability and Statistics, 3rd ed.*, by Morris DeGroot and Mark Schervish
- *Introduction to Linear Optimization*, by Dimitris Bertsimas and John Tsitsiklis
- *Monte Carlo Methods in Financial Engineering*, by Paul Glasserman

Grading

Grading will be based on one take-home assignment and one take-home examination in each term equally weighted. You will be asked to sign a statement indicating that the work you submit is yours and yours alone for these evaluations.

All grading is $A - F$ with \pm (except $A+$ & F), 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.

Academic dishonesty in any portion of the academic work shall be grounds for awarding a grade of F .

Grades for FM 5031/2 sections in each term are averaged at weights according to the number of weeks for each section. This section's weight is $\frac{7}{15}$.

Schedule

Please complete the scheduled reading before each class session.

Fall term, FM 5031 section

date	subject	reading
5 Sep	probability & simulation intro	M 1.1–1.2, CW 1
12 Sep	distributions & processes	M 1.3, CW 2.1–2.3
19 Sep	random variates & monte carlo	CW 4–5
26 Sep	dependence	M 2
3 Oct	modeling the markets	M 3
10 Oct	variance reduction	CW 6
17 Oct	baskets	CW 8

The evaluation assignment for Fall term will be distributed on 19 September and collected on 26 September. The examination will be distributed on 17 October and collected on 24 October at the beginning of the next section.

The last day to cancel the FM 5031 sequence, without permission from the Mathematics office, is 12 October.

Spring term, FM 5032 section

date	subject	reading
23 Jan	estimators	M 4
30 Jan	optimization	M 5–6.2
6 Feb	mean-variance	M 6.3–6.7
13 Feb	bayesian estimation	M 7
20 Feb	evaluating allocations	M 8
27 Feb	Black-Litterman allocation	M 9.1–9.2
5 Mar	robust allocation	M 9.3–9.5

The evaluation assignment for Spring term will be distributed on 6 February and collected on 13 February. The examination will be distributed on 5 March and collected on 12 March at the beginning of the next section.

The last day to cancel the FM 5032 sequence, without permission from the Mathematics office, is 29 February.

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 211 Eddy Hall (624-7272) for assistance.

Students with disabilities that affect their ability to participate fully in class or to meet all course requirements are encouraged to bring this to the attention of the instructor so that appropriate accommodations can be arranged. Further information is available from Disabilities Services (230 McNamara).

University policy prohibits sexual harassment as defined in the December 1998 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 in 419 Morrill Hall.

The University Senate's academic policies are available at

<http://www1.umn.edu/usenate/usen/policies.html>

The University's Student Conflict Resolution Center website is

<http://www1.umn.edu/sos/index.html>