Math 574: Portfolio Valuation and Risk Management
Fall 2016 WPI

Professor: Marcel Blais

Stratton Hall 104A
508-831-5677
myblais@wpi.edu

Office Hours: See myWPI

By Appointment

Class Info: Tuesday, 2:00pm – 3:15pm, Stratton Hall 309
Thursday, 2:00pm – 3:15pm, Stratton Hall 309
myWPI will be used to manage many of the course details.

Text: *Statistics and Finance: An Introduction*, by David Ruppert,
ISBN 0-387-20270-6

Overview: Balancing financial risks versus returns via the use of asset diversification is one of the fundamental tasks of quantitative financial management. This course is devoted to the use of statistics and mathematical optimization to allocate assets, to construct and manage portfolios, and to measure and manage the resulting risks. Specifically this course covers asset return modeling, time series models, Markowitz's portfolio theory, mean-variance optimization and efficient frontiers, regression, Sharpe's single index and capital asset pricing models (CAPM), structural and statistical multi-factor models, cointegration, risk allocation and risk budgeting. Other topics may include GARCH models, the intertwining of optimization and statistical methodologies in modern portfolio management, including resampled efficiency, robust and Bayesian statistical methods, or robust portfolio optimization.

Grading: The final grades will be computed using:

HW & Projects	70%
Midterm Exam	30%

Computing: Some assignments, including projects, will require computing resources. MATLAB, Python, Microsoft Excel, and Bloomberg will be used. Students will use paper trading accounts provided by Interactive Brokers LLC.

Exams: Thursday 10/13/2016 Midterm Exam, In Class

Make-up Exam Policy:
Make-up exams will only be allowed in the event of a documented emergency. You are responsible for avoiding conflicts with the exam. Do not plan to leave campus for the semester before the final class on 12/16/2016.

Homework: There will be regular homework assignments. In general students are allowed to work together on homework assignments, but solutions must be written up independently.

Project: There will be multiple projects assigned. These will be implemented using MATLAB, Microsoft Excel, and the Interactive Brokers paper trading account.

Students may be required to present project results. Students are *required* to work in pairs for the projects.

Late HW: Late assignments without prior consent of the professor will not be accepted and will receive a grade of 0. Extensions will be granted only in the event of unforeseen emergencies or extenuating situations that you discuss with the professor in advance.

Additional References:

- *Statistics and Data Analysis for Financial Engineering*, by David Ruppert, ISBN 978-1-4419-7786-1
- *Stochastic Calculus for Finance II: Continuous-Time Models*, by Steven Shreve, ISBN 0-387-40101-6
- *Derivative Securities, Second Edition*, by Robert Jarrow & Stuart Turnbull.
- *Options, Futures, and Other Derivatives, 8th Edition*, by John C. Hull.
- MATLAB materials: http://www.cs.cornell.edu/courses/cs99/2003su/

Academic Honesty: WPI has an established academic honor code, described in *The WPI Student Judicial Policies and Procedures*. Each student is expected to familiarize him/herself with WPI's Academic Honesty policies, which can be found at http://www.wpi.edu/offices/policies/honesty.
All acts of fabrication, plagiarism, cheating, and facilitation will be prosecuted according to the university's policy. If you are ever unsure as to whether your intended actions are considered academically honest or not, please see Prof. Blais.

Disability Services: If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me, please make an appointment as soon as possible. If you have not already done so, students with disabilities, who believe that they may need accommodations in this class, are encouraged to contact the Office of Disability Services (ODS), as soon as possible to ensure that such accommodations are implemented in a timely fashion. The DSO is located in 137 Daniels Hall, its phone number is (508) 831-4908, and its email is DisabilityServices@wpi.edu.

This syllabus is subject to change at the professor's discretion.