Financial Statistics & Risk Management
Master’s Degree Program

A Brief Overview
Definition of financial statistics:

• Application of statistical methods to analyze financial markets data including use of:
  – informal, often graphical, analysis and data visualization techniques
  – formal methods, such as estimation and testing, based on statistical inference
  – advanced statistical techniques including ARIMA models, regression, multivariate models, copulas, GARCH models, factor models, co-integration, Bayesian statistics, nonparametric regression, state space models and advanced filtering methods.
Risk Management

Risk depends on the probability distribution of a return:

• calculate, manage, mitigate and monitor credit, market, operational and other types of risk probability loss distributions and exposures

• calculate optimal levels of hedged exposures and risk transfers

• perform scenario analysis and stress testing of banks’ ability to absorb and survive low probability, large impact events

• calculate regulatory and economic capital requirements
Beyond Risk Management

Other applications of statistics in finance include:

- Identifying trading and investment opportunities resulting from market arbitrage conditions or macro-economic imbalances or trends

- Selecting and optimizing investment portfolios

- Calibrating derivative pricing models

- Forecasting and modeling drivers of market trends and growth

- Creating internal credit scoring and rating tools
The FSRM Difference

**Traditional Quantitative Finance** focuses on complex mathematical modeling for developing and pricing custom derivative products.

**FSRM** encompasses financial engineering concepts such as no-arbitrage pricing and risk neutral probabilities but emphasizes statistical and data analytics such as:

- measuring, monitoring, managing and mitigating uncertainty, risk and volatility
- optimizing asset weights for portfolio selection
- modeling market trends
- extracting meaningful information from huge volumes of financial data and making it actionable
FSRM students learn the following skills, among others:

- parametric/non-parametric statistical methods
- advanced regression and time series analysis
- data mining/visualization, predictive analytics
- simulation and computational tools
- the statistics and probability tools of risk management
  - default probability and loss-given-default distributions
  - scenario analysis, simulations and stress testing
  - GARCH, copulas and other tools for correlation estimation
  - VaR, CVaR and Expected Loss measures
  - Estimating and simulating event driven loss distributions
Sample Curriculum

Fall Semester, Year 1

- Methods and Theory of Probability with Financial Applications
- Regression Analysis in Finance
- Foundations of Financial Statistics and Risk Management
- Advanced Programming for Financial Statistics and Risk Management
Sample Curriculum

Spring Semester, Year 1

• Methods of Statistical Inference with Financial Applications
• Financial Time Series Analysis
• Advanced Statistical Methods in Finance
• Advanced Simulation Methods for Financial Applications
Sample Curriculum

Fall Semester, Year 2

• Financial Data Mining

• Financial Risk Evaluation and Management
FSRM develops work ready students:

- Advisory Board: tap into the knowledge of senior executives from financial institutions and academicians
- Practitioner’s Seminar and Practitioner as Instructor: experienced professionals give talks and teach selected topics
- Summer and final semester internships
- Project work experience
- Prepare for Global Association of Risk Professionals (GARP) Financial Risk Manager (FRM) Certification Exams in parallel with degree
- Career development training
Some institutions where students and graduates have obtained positions:

- Deutsche Bank
- Global Risk Management Advisors
- Capital One
- Cantor Fitzgerald
- GSB Podium Advisors
- ConvergEX Group
- Hewlett Packard
- The Federal Reserve
- Office of Management and Budget – NYC
Application Requirements

What you need to apply:

- Official transcripts
- Three letters of recommendation
- Personal statement
- GRE or GMAT test scores
- TOEFL or IELTS test scores (international students)
Rutgers University’s pedigree:

- Chartered in 1766; eighth oldest university in the U.S.
- Largest university in NJ
- 280+ undergraduate, graduate and professional degree programs across 175 academic departments
- Nearly 40,000 students
- 40 miles from New York City
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