IOMS SPECIALIATIONS

I. DATA, MODELS, AND DECISIONS (DMD)

II. MANAGEMENT OF TECHNOLOGY AND OPERATIONS (MOTO)

III. SUPPLY CHAIN MANAGEMENT & GLOBAL SOURCING

IV. FINANCIAL SYSTEMS AND ANALYTICS

V. QUANTITATIVE FINANCE
DATA, MODELS, AND DECISIONS

The Data, Models, and Decisions specialization deals with the use of data and quantitative models as a means for aiding the decision process in all of the functional areas of business. The use of data and mathematical models has become very important in business because of the volume of data available as a result of the internet and scanners of consumer purchases. With the explosion of information that is available it is important that students have an understanding of the use of data and mathematical models in order to be able to make better decisions, especially in the face of uncertainty.

A specialization in Data, Models, and Decisions enables the student to understand and use different mathematical and statistical models to apply to their own area of interest. As examples:

1. A financial analyst may want to predict the return on a stock from the return on an index.
2. A production engineer may want to predict the time to complete a given task in terms of characteristics of that task.
3. A media buyer may want to measure the impact of advertising and other variables on sales.

A specialization in Data, Models, and Decisions allows students to choose from a menu consisting of a wide variety of relevant courses in statistics, operations, information technology, and marketing, according to their area of interest and career path. The skills learned in these specializations would help them be more effective in their careers as Financial Analysts, Consultants, and Marketing Research experts.

REQUIREMENTS:

Select any three courses from the following list. Regression analysis is fundamental to analyses carried out in all functional areas of business, and it is strongly suggested that either B90.2301 or B90.3302 be selected as one of the three courses for this specialization.

B20.2350 Trading Strategies & Systems  B70.2150 Marketing Engineering
B20.3136 Search and the New Economy  B70.2327 Introduction to Marketing Research
B20.3336 Data Mining & Business Intelligence  B90.2301 Regression & Multivariate Data Analysis
B20.3350 Financial Information Systems  B90.2302 Forecasting of Time Series Data
B30.3351 Econometrics I  B90.2309 Mathematics of Investment
B60.2310 Managing for Quality  B90.3301 Introduction to Probability Theory
B60.2325 Introduction to Operations Research  B90.3302 Statistical Inference & Regression Analysis
B60.2330 Retail Operations  B90.3306 Time Series Analysis
B60.2350 Decision Models  B90.3321 Introduction to Stochastic Processes

CAREER PATH RECOMMENDATIONS:

Finance
B20.2350 Trading Strategies & Systems  B90.3306 Time Series Analysis
B20.3336 Data Mining & Business Intelligence  B90.2308 Applied Stochastic Processes for Financial Models
B20.3350 Financial Information Systems  B90.2309 Mathematics of Investment
B30.3351 Econometrics I  B90.3301 Introduction to Probability Theory
B90.2301 Regression & Multivariate Data Analysis  B90.3302 Statistical Inference & Regression Analysis
B90.2302 Forecasting of Time Series Data  B90.3321 Introduction to Stochastic Processes

Consulting
B20.3336 Data Mining & Business Intelligence  B60.2350 Decision Models
B20.3136 Search and the New Economy  B90.2301 Regression & Multivariate Data Analysis
B20.3351 Risk Management Systems  B90.2302 Forecasting of Time Series Data
B60.2325 Introduction to Operations Research

Marketing
B20.3336 Data Mining & Business Intelligence  B70.2327 Introduction to Marketing Research
B60.2310 Managing for Quality  B90.2301 Regression & Multivariate Data Analysis
B60.2330 Retail Operations  B90.2302 Forecasting of Time Series Data
B60.2350 Decision Models  B90.3301 Introduction to Probability Theory
B70.2150 Marketing Engineering  B90.3302 Statistical Inference & Regression Analysis
MANAGEMENT OF TECHNOLOGY AND OPERATIONS

The management of Information Technology and Operations in an integrated manner and their strategic alignment with business models is essential to achieving business success. Operational excellence is the key driver to performance in a world that is increasingly driven by information.

Operations Management provides the tools to analyze, improve and position a firm's operations to achieve the best fit with the firm's competitive strategy, marketing priorities and financial constraints. It provides a link to strategy and its successful execution. It makes available metrics for managing businesses, such as, six sigma quality, order to delivery cycle, inventory turns, and capacity utilization.

Information technologies continually redefine possible business models and operations across industries, creating new markets, channels and spaces of interaction. They are an integral part of developing new products, designing new organizations, managing customer relationships, and in achieving operational excellence.

A specialization in Management of Technology and Operations enables you to think about technology-enabled business models, and the alignment of IT and Operations with corporate strategy. Decisions about investments in IT and the design of operations have far reaching consequences for development of products and services, managing customers, and achieving operational excellence. Courses in this specialization will provide you with the following capabilities:

1. Linking the success and valuation of organizations with the effective design and management of its IT assets, data and Operations.
2. Aligning Operations Strategy and IT with business models and understanding how to make investment decisions regarding IT and Operations.
3. Crafting Operations and IT strategies to exploit emerging opportunities enabled by digital convergence and the increasingly electronic nature of all aspects of business.

This specialization is especially suitable for careers in Financial Services, Management of Information Technology and Operations. The specialization is also suitable for careers in consulting, especially in areas of Operations and IT strategy. Finally, considering the extent to which the Internet is fueling new opportunities, the specialization is very useful for those interested in entrepreneurship.

REQUIREMENTS:

Select any three courses from the following list:

B20.2314 Managing the Digital Firm  B20.3362 Emerging Technologies & Business Applications
B20.2318 Information Technology & Corporate Strategy  B20.3338 E-Commerce: Management in Digital Markets
B20.3136 Search & the New Economy  B60.2306 Supply Chain Management
B20.3138 Digital Markets & E-Commerce  B60.2310 Quality Management
B20.3147 IT Strategy  B60.2313 Operations in Entertainment: Las Vegas
B20.3155 Global Outsourcing Strategy  B60.2315 Operations in Financial Services
B20.3156 On-Line Privacy  B60.2320 IT in Supply Chains
B20.3157 Computer & Network Security  B60.2330 Retail Operations
B20.3322 Design & Development of Web-Based Systems  B60.2350 Decision Models
B20.3336 Data Mining & Business Intelligence  B60.2360 Operations in Real Estate Development
B20.3338 E-Commerce: Management in Digital Markets  B60.2365 Operational Risk
B20.3356 Business Process Design & Implementation  B60.3335 Operations for Global Entrepreneurs
B20.3358 Data Governance  B60.3355 Operations Strategy
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IOMS Specializations

Finance
B20.2318 Information Technology & Corporate Strategy
B60.2315 Operations in Financial Services
B60.2350 Decision Models
B60.2360 Operations in Real Estate Development
B60.3355 Operations Strategy
B60.3357 Service Operations & Strategy

Consulting
B20.2318 Information Technology & Corporate Strategy
B20.3155 Global Outsourcing Strategy
B20.3158 Data Governance
B20.3322 Design & Development of Web-Based Systems
B20.3336 Data Mining & Business Intelligence
B20.3356 Business Process Design & Implementation
B20.3355 Operations Strategy
B20.3362 Adv Technologies for Business Applications
B60.2306 Supply Chain Management
B60.2350 Decision Models
B60.2360 Operations in Real Estate Development
B60.3355 Operations Strategy
B60.3357 Service Operations & Strategy

Entrepreneurship
B20.2314 Managing the Digital Firm
B20.3155 Global Outsourcing Strategy
B20.3358 E-Commerce: Management in Digital Markets
B20.3362 Adv Technologies for Business Applications
B60.2306 Supply Chain Management
B60.2360 Operations in Real Estate Development
B60.3355 Operations Strategy
B60.3357 Service Operations & Strategy
SUPPLY CHAIN MANAGEMENT & GLOBAL SOURCING

Several factors have made crafting a supply chain and sourcing strategy the central focus for firms. These include the rapid changes in consumer demand for products and services, the globalization of the economy and the availability of advanced planning and communication tools for coordinating the activities of supply chain participants. Outsourcing and offshoring of services such as IT, finance and accounting, human resources, medical transcription, and even R&D are expected to continue to grow exponentially in the next decade.

The function of supply chain management is to optimally design and manage the flows of funds, material and information to implement a firm’s business strategy. Supply chain decisions have a direct impact on the revenue side because they affect both market penetration as well as customer service. On the cost side, logistics account for 20-25% of a typical firm’s total cost. Global sourcing affects both sides of the equation. It lowers costs through access to inexpensive resources and increases revenue by increasing responsiveness through the creation of supply options. In addition, global sourcing brings to the forefront the issues of supply chain management not only in manufacturing, but also in services.

The purpose of a specialization in Supply Chain Management and Global Sourcing is primarily to give students the ability to develop supply chain and sourcing strategies. Second, the student becomes acquainted with the global trends in this area as well as the innovative strategies and solutions crafted by leading players. Finally, students obtain skills and tools for designing and managing supply chain operations, for coordinating activities of buyers and sellers, evaluating the scope for outsourcing, crafting performance metrics for service systems, IT system design and implementation, supplier relationship management, etc.

This specialization is of direct interest to students that wish to pursue a career in any type of management consulting, managing information systems, product management, and supply chain management. In addition, students that wish to pursue a career in human resources management, sales and marketing, investment banking, and other financial services will find a substantial number of courses within this specialization of interest.

REQUIREMENTS:

Select any three courses from the following list:

- B20.2320 Customer Relationship Management Systems
- B20.3136 Search & the New Economy
- B20.3138 Digital Marketing & E-Commerce
- B20.3155 Global Outsourcing Strategy
- B20.3156 Online Privacy
- B20.3336 Data Mining & Business Intelligence
- B20.3338 E-Commerce: Managing in Digital Markets
- B20.3355 Global Outsourcing Strategy
- B20.3356 Business Process Design & Implementation
- B20.3362 Advanced Technologies for Business Apps
- B40.3162 Financial E-Commerce
- B60.2306 Supply Chain Management
- B60.2320 IT in Supply Chains
- B60.2330 Retail Operations
- B60.2350 Decision Models
- B60.2365 Operational Risk
- B60.3335 Operations for Global Entrepreneurs
- B60.3355 Operations Strategy
- B60.3357 Service Operations & Strategy
- B60.3359 Sales Management
- B65.2340 Multinational Business Management
- B65.2353 Pricing Strategies
- B70.2345 Building & Managing Customer Relations
- B70.2385 International Marketing
- B90.2301 Regression & Multivariate Data Analysis

It is highly recommended that a student with little background in the subject should select one course related to sourcing, one to supply chain operations or strategy, and one to distribution or customer relationship management or marketing. These correspond to the source, make & move, and sell aspects of supply chain management.

CAREER PATH RECOMMENDATIONS:

Supply Chain Management

- B20.2320 Customer Relationship Management Systems
- B20.3138 Digital Marketing & E-Commerce
- B20.3155 Global Outsourcing Strategy
- B60.2306 Supply Chain Management
- B60.2320 IT in Supply Chains
**Consulting**
- B20.3147 IT Strategies
- B20.3155 Global Outsourcing Strategies
- B60.2306 Supply Chain Management
- B60.2307 Operations Consulting

**Product Management**
- B20.3155 Global Outsourcing Strategy
- B20.3322 Design & Development of Web-Based Systems
- B20.3336 Data Mining & Business Intelligence
- B60.2306 Supply Chain Management
- B60.2320 IT in Supply Chains

**Continued on next page:**
- B60.2310 Managing for Quality
- B60.2350 Decision Models (cont. next page)
- B60.2365 Operational Risk
- B90.2301 Regression & Multivariate Data Analysis

- B60.2330 Retail Operations
- B60.2350 Decision Models
- B60.2365 Operational Risk
- B60.3355 Operations Strategy
FINANCIAL SYSTEMS AND ANALYTICS

As financial markets become more electronic and more liquid, a higher degree of knowledge about systems and analytics is required in order to compete. Modern financial markets function as a network of systems and information flows. Understanding how these work is becoming increasingly important for careers in virtually all areas of Finance including investment banking, sales and trading, asset management, and administration. The financial industry is a major employer in New York City and of significant interest to Stern students. This specialization covers areas useful for careers in trading, hedge funds, risk management, and IT and operations.

Courses in this specialization are of two types. The first are breadth courses that describe how various financial markets work and the kinds of systems, processes and people required for managing financial businesses. The second are depth courses that provide tools and decision making skills geared towards trading, risk management, or the management of IT and operations in a financial services company. Specifically, they provide skills that include building investment strategies, analyzing them, understanding how to compare different types of strategies or portfolio managers, how to calculate risk and know when to use various risk models, and so on.

The purpose of a specialization in Financial Systems and Analytics is primarily to give students the ability to function effectively in the financial services industry by providing skills they need on the job from day one. Second, and more broadly, the purpose is to complement specializations in Finance by providing an understanding of how financial markets are continually disintermediated by information technologies, and the consequences of this phenomenon. The specialization should be particularly useful to those seeking careers in any industry where information technologies and data play a key role in managing risk. Examples include trading, risk management, sales, analysts, management of IT and operations, payment systems, etc. The specialization should also be useful to those interested in careers in the growing hedge fund industry and in consulting.

REQUIREMENTS:

Select any three courses from the following list:

- B10.3304 Modeling Financial Statements
- B10.4310 Analytical Models in Accounting
- B20.2350 Trading Strategies & Systems
- B20.3336 Data Mining & Business Intelligence
- B20.3350 Financial Information Systems
- B20.3351 Risk Management Systems
- B40.3312 Risk Management in Financial Institutions
- B40.3349 Equity Market Trading & Structure
- B55.2310 Managing Financial Businesses
- B60.2315 Operations in Financial Services
- B60.2350 Decision Models
- B60.2360 Operations in Real Estate Development
- B90.2301 Regression & Multivariate Analysis
- B90.2302 Forecasting of Time Series Data
- B90.2308 Applied Stochastic Processes for Financial Models
- B90.2309 Mathematics of Investment
- B90.3301 Introduction to the Theory of Probability
- B90.3302 Statistical Inference & Regression Analysis
- B90.3306 Time Series Analysis
- B90.3321 Stochastic Processes I

CAREER PATH RECOMMENDATIONS:

Hedge Funds, Sales & Trading, Risk Management
- B20.2350 Trading Strategies & Systems
- B20.3350 Financial Information Systems
- B20.3351 Risk Management Systems
- B55.2310 Managing Financial Businesses
- B60.2350 Decision Models
- B90.2301 Regression & Multivariate Analysis
- B90.2302 Forecasting of Time Series Data
- B90.2308 Applied Stochastic Processes for Financial Models
- B90.2309 Mathematics of Investment
- B90.3306 Time Series Analysis

Strategy & Administration
- B20.3350 Financial Information Systems
- B20.3351 Risk Management Systems
- B55.2310 Managing Financial Businesses
- B60.2315 Operations in Financial Services
- B60.2360 Operations in Real Estate Development

Technology & Operations in Financial Markets
- B20.2350 Trading Strategies & Systems
- B20.3350 Financial Information Systems
- B20.3351 Risk Management Systems
- B60.2360 Operations in Real Estate Development
- B60.3360 Operations in Financial Services
A specialization in Quantitative Finance prepares students for careers in finance that are more mathematically demanding than the typical M.B.A. paths. In recent years we have seen an increase in the demand for analytical skills in the financial service industries. Understanding recent developments in financial markets and products requires a degree of sophistication not only in finance, but also in stochastic processes, statistics, and applied economics. Courses with both Finance and Statistics allow students to pursue advanced work in these areas. The financial instruments that are taught in these courses prepare students to enter the financial world with knowledge of still-developing assessment techniques.

There are two categories of courses from which students can select to do a Quantitative Finance specialization. There are courses in Statistics and courses in Finance.

I. STATISTICS (statistics courses with quantitative finance applications)

B90.2302 The Forecasting of Time Series Data
B90.2308 Applied Stochastic Processes for Financial Models
B90.2309 Mathematics of Investment
B90.3301 Introduction to the Theory of Probability
B90.3321 Introduction to Stochastic Processes
B90.3323 Stochastic Models in Finance

II. FINANCE (quantitatively oriented finance courses)

B40.3332 Advanced Portfolio Analysis
B40.3333 Debt Instruments and Markets
B40.3335 Futures and Options
B40.3340 Advanced Futures and options

For a Quantitative Finance specialization, students would elect to take one course from each of the above categories. The third course can be any Statistics course from Category I above or any Finance course offering (not restricted to Category II above). Hence students can select either two courses in finance and one in statistics or two courses in statistics and 1 course in finance.

NOTE:

1. Courses having a B90.2xxx number require no or very little additional mathematical preparation beyond the core course in Statistics and Data Analysis, B01.1305.
2. Courses having a B90.3xxx number require additional mathematical background in such areas as calculus and/or linear algebra. Please see the course descriptions for the information on prerequisites.