Master of Business Administration

MBA Concentration Summary

You have the option of picking a concentration but it is not a requirement to have a concentration. A concentration consists of 4 courses (12 credits). Concentration courses are offered in fall and spring terms annually. Suggested MBA concentration options include:

- Business Analytics
- Finance
- Management Information Systems
- Marketing — New Product Development
- Supply Chain Management
- Technological Entrepreneurship

Business Analytics

The business analytics concentration, like a major, focuses on using information to develop business insights and influence decision-making in organizations. This provides a strong foundation in analytical modeling and statistical methods as well as skills in data management. It provides hands-on experience through industry projects in applying these skills in data and model driven decision-making in domains such as marketing, supply chain management, healthcare, and finance.

All students in the business analytics concentration should take**:**

- **MGMT 6560 Introduction to Machine Learning Applications (F, S)**
  The widespread proliferation of IT-influenced economic activity leaves behind a rich trail of micro-level data, enabling organizations to use analytics and experimentation in both strategy and operations. This course provides a hands-on introduction to the concepts, methods, and processes of business analytics. Students will learn how to obtain data and draw business inferences from data by asking the right questions and using the appropriate tools.

Choose three (3) from an evolving list of related electives, as approved by the adviser. Sample courses include:

- **ARTS 4870 Creative Data Design (not offered in Fall 2019)**
  Data design offers a way to reveal, analyze and engage with data, from scientific visualization to information design to artistic sonification. At the same time, the translation from abstract data to image and sound carries risks of manipulation and subjective interpretation. This course introduces contemporary practices in the perceptualizing of data using digital tools for creative exploration and critical analysis. It explores the evolution of visualization and the notion of truth through visual representation.

- **MGMT 6570 Advanced Data Resource Management (F, S)**
  The primary objective of this course is to introduce the multifaceted role of data as a resource of the organization, in three ways. First, it examines the role of data at the operational, tactical, and strategic levels of the organization. Second, it provides students with knowledge and hands on training of technologies that manipulate data, including structured query language (SQL), extraction transformation and loading tools (ETL), data warehousing (DW), online analytical processing (OLAP), and data mining (DM). The course exposes students to big data management techniques. Finally, the course provides students the theory and hands on training to understand the transformation of data to information.

- **MGMT 6460 Modeling & Optimization (F,S)**
  This graduate level course is designed to provide the student with an understanding of the applications of quantitative models, methods, algorithms, and computational techniques across business functions. You will investigate how to apply optimization methods using a hands-on implementation approach.

- **ISYE 6961 Data Analytics Research Lab (F)**

This course focuses on applied data analytics research on real-world open problems. Students will conduct a semester long, team based, hands-on data analytics project. A data set will be selected at the start of the semester from a collection of projects supplied by on- and/or off-campus clients. The client will provide project and data set background and assist in objective setting. Alternatively, a student and/or team may bring a data set and problem with them. This is expected to be useful for graduate students with their advisor and/or research collaborators being the clients. Students will actively engage in the process of transforming knowledge to data, gaining experience applying data analytic methods learned in prior courses. Students will also be instructed in the process of project objective setting, planning, and management. They will conduct their project based on goals agreed upon with the project client, and a workflow they develop to attain these goals. Students will be guided via classroom demonstrations and individualized team coaching by the instructors in the employment of visualization, analytics and modeling methods. The demonstrations will be done in the R data analytics environment and will involve the use of R routines, external packages, script building and the use of pre-built scripts provided by the instructors. An R 'boot camp' will be held at the beginning of the semester to get those unfamiliar with the environment started. Students will be encouraged to use R, but this will not be required.

- **CSCI 6100 Machine & Computational Learning (F)**

Introduction to the theory, algorithms, and applications of machine learning (supervised, reinforcement, and unsupervised) from data: What is learning? Is learning feasible? How can we do it? How can we do it well? The course offers a mix of theory, technique, and application with additional selected topics chosen from Pattern Recognition, Decision Trees, Neural Networks, RBF's, Bayesian Learning, PAC Learning, Support Vector Machines, Gaussian processes, and Hidden Markov Models. Students cannot receive credit for both CSCI 4100 and CSCI 6100.

- **CSCI 6390 Data Mining (F)**

This course will provide an introductory survey of the main topics in data mining and knowledge discovery in databases (KDD), including classification, clustering, association rules, sequence mining, similarity search, deviation detection, and so on. Emphasis will be on the algorithmic and system issues in KDD, as well as on applications such as Web mining, multimedia mining, bioinformatics, geographical information systems, etc. Students cannot receive credit for both CSCI 4390 and CSCI 6390.

- **MGMT 6962 – Marketing Analytics (S)**

With the development of technology, the amount of available information that can help organizations make decisions grows exponentially over the past decades. These information could be structured data such as online transaction data or highly unstructured data such as blogs, tweets and video clips. With the abundant data, firms can extract customer purchasing pattern, identify potential market and forecast sales trends, gain competitive advantage and create substantial value for the company. This class introduces some fundamental statistical models which are very effective in explaining and predicting marketing patterns using new forms of information emerging from the technology advances. These models can significantly improve the decisions by practitioners as they also offer intuitively sounds descriptions on various observed data patterns. Meanwhile, as more and more firms adopt sophisticated toolkit to conduct business analysis (Excel toolkit, SPSS and etc.), understanding these statistical models can become an essential part of regular business. The contents we covered in this course will be helpful for managers to get the greatest business value in today's data intensive business environment. We will also apply these statistical models to real marketing problems using real marketing data. Students are expected to finish a final project by applying techniques covered in this class on a real world dataset. This is because the core of developing the quantitative skills in this class is through hands-on exercises. This project is designed to enhance students' understanding of the concepts introduced in this class, and to allow students to have the opportunity to absorb the skills rather than just get exposed to them.

- **MGMT 6720 – Internet Marketing (S)**

Technology is a vital link in how modern corporations identify, acquire, transact with, and keep their customers. This course provides an introduction to both the technology infrastructure most relevant to the customer relationship as well as marketing issues that result from the application of computers and communication networks. Topics include issues related to social media, search, online advertising, blogging, customer relationship management, online market segmentation, and marketing of IT products.

- **MGMT 6160 – Applied Analytics and Predictive Modeling (S)**

Business analytics enables organizations to leverage large volumes of data in order to make more informed decisions. It encompasses a range of approaches to integrating, organizing, and applying data in various settings. This course develops an understanding of concepts in business analytics and data manipulation. In particular, through hands-on experience with a range of techniques students will learn to work with large data sets, analyze trends and segments and develop models for prediction and forecasting. This course is part of the Master's program in Business Analytics and builds on foundations learned in the fall semester.

- **ITWS 6600 – Data Analytics (S)**

The world at-large is confronted with increasingly larger and complex sets of structured/unstructured information; from cyber and human sources. Traditional enterprises are moving toward analytics-driven approaches for core business functions. Data and information analytics extends analysis (descriptive models of data) by using data mining and machine learning methods, with optimization and validation, to recommend action or guide and communicate decision-making. Thus, analytics is an entire methodology rather then individual analyses or analysis steps

- **COMM 6880 – Interactive Data Visualization (U-Summer**)

This course covers interactive, multimedia interface design (for Web Sites and apps) for data visualization or other forms of interactive information design. Innovative designs that explore new directions in interface data design are highlighted. Topics include multisensory information design using graphics, sound, touch, and large-scale data projection. Interface design topics include user-centered design, information architecture, rapid prototyping, cross-cultural design and intellectual property. Students may choose the applications they want to design for the class project.

Finance

The finance elective set prepares students for a career path in corporate finance and for careers in financial services. The special finance challenges in high-tech industries are explored as well as the impact of technology on financial markets and the financial manager in modern corporations. Students following the finance concentration may elect two paths: investments or corporate finance. The investments option focuses on financial markets and securities, including stocks, bonds, and derivatives. Students taking this option learn about decision-making such as portfolio choices, making markets in securities, and analyzing non-standard forms of investments. The corporate finance option should be pursued by students who are interested in working and making decisions within firms. This option deals with financing and investment (real and financial) decisions within business entities such as corporations, sole proprietorship, partnerships or a limited liability corporation.

All students in the finance concentration should take:

- **MGMT 6430—Financial Statement Analysis**

This course is designed to strengthen students' ability to correctly analyze, interpret and evaluate financial statements and their accompanying disclosures. The course is aimed at anyone whose career might involve working with accounting data and should be especially useful for those interested in consulting and financial analysis. Discussed throughout the semester will be how to use financial accounting information for evaluating past performance and predicting future performance of a company or division. Also discussed will be the key disclosure rules in the United States, the communication methods available to managers, managers' incentives and ability to exert discretion over reported earnings, and the interplay between a company's corporate strategy and its financial reporting policies and practices. The course revolves around a number of topics of recent interest to the business community including accounting and financial analysis, performance forecasting, the quality of earnings, mergers and acquisitions, purchased R&D, post-employment benefits, executive compensation, and intangible assets. This course assumes that students have a basic knowledge of accounting, finance, economics and business strategy. The focus is on integrating key concepts from each of these areas and applying them to financial decision-making. Half of the course time will be devoted to case analysis. Students are responsible for reading each case thoroughly and familiarizing themselves with the relevant accounting issues before the class.

Students can elect one of two concentration options: Investments or Corporate Finance.
All students must take MGMT 6430 and then select three courses from one of the options below.

Investments Option
- **MGMT 6240 – Financial Trading and Investing (F)**
* Pre-requisite: MGMT 6020 or permission of instructor
This course introduces interactive trading in financial instruments. Students learn the principles of asset price discovery and trading methods in a variety of markets, including equities, bonds, options, and other derivatives. Investing topics addressed include the application of quantitative methods in asset valuation, portfolio design, alternative investments, and risk management. Students work in teams of two in programming assignments involving foreign exchange markets, equities trading, and portfolio construction.

- **MGMT 6370 – Options, Futures and Derivatives Markets (F)**
* Pre-requisite: MGMT 6020 or permission of instructor
The purpose of this course is to provide an introduction to second generation financial instruments including forward and future contracts, options, future options and swaps on a variety of underlying instruments including fixed income securities. The fixed income markets will be integrated with the discussion of IRDs (interest rate derivatives.)

- **MGMT 6410 – Quantitative Asset Management (S)**
* Pre-requisite: MGMT 6020 or permission of instructor
The course begins by providing students with a theoretical and practical background in the field of investments. This includes comparison of asset classes characteristics and returns as well as discussion of relevant models, financial institutions, and behavioral issues facing investors. These principles are then quantitatively applied in areas including portfolio construction, index-linked strategies, smart beta/factor portfolios, portfolio risk management, and dynamic portfolio management.

- **MGMT 6420 – Student Managed Investment Fund (S)**
* Pre-requisite: MGMT 6240 or permission of instructor

The Student Managed Fund course will actively invest real capital using financial market principles. The goal of the fund is to produce excess returns consistent with the performance of long/short hedge funds through use of fundamental, technical and quantitative strategies driven by economic analysis. The goal of the course is to directly apply the analytical financial skills developed within other Lally courses and provide students with both instructor and peer real-time feedback for their work.

Corporate Finance Option
- **MGMT 6380 – Advanced Corporate Finance (F)**

* Pre-requisite: MGMT 6020 or permission of instructor

The overall objective of this course is to study advance corporate finance issues and test empirically the stock market reaction to financing decisions and the issuance of securities. Corporate finance topics include shareholder value and economic value-added concepts, as well as corporate governance issues. Financing decisions include venture capital and initial public offerings, seasoned equity offerings, stock splits, corporate bonds and bank loans, stock listings on foreign exchanges. Other topics are mergers and acquisitions, pension fund management, financial analysis, and planning. Real stock prices and case studies are used to apply the theoretical concepts.

- **MGMT 6370 – Options, Futures and Derivatives Markets (F)**

* Pre-requisite: MGMT 6020 or permission of instructor

The purpose of this course is to provide an introduction to second generation financial instruments including forward and future contracts, options, future options and swaps on a variety of underlying instruments including fixed income securities. The fixed income markets will be integrated with the discussion of IRDs (interest rate derivatives.)

- **MGMT 6410 – Quantitative Asset Management (S)**

* Pre-requisite: MGMT 6020 or permission of instructor

The course begins by providing students with a theoretical and practical background in the field of investments. This includes comparison of asset classes characteristics and returns as well as discussion of relevant models, financial institutions, and behavioral issues facing investors. These principles are then quantitatively applied in areas including portfolio construction, index-linked strategies, smart beta/factor portfolios, portfolio risk management, and dynamic portfolio management.

- **MGMT 6250 – Fixed Income Securities (S)**

This course develops the concepts and tools that will provide students with an understanding of the forces driving the valuation, risk and return of fixed income securities. These include instruments such as futures, options, callable bonds, credit default swaps and mortgage-backed securities. The size of these markets makes their pricing, hedging, and risk management invaluable to traders, risk managers, regulators or anyone interested in the functioning of the modern financial system.

- **ECON 6340 – Behavioral Financial Economics (F)**

This course describes how individuals and firms make financial decisions, and how those decisions might deviate from those predicated by traditional financial or economic theory. The course examines how the insights of behavioral economics complement the traditional finance paradigm by introducing some of the main psychological biases in financial decision-making and examining the impacts of these biases in financial markets and other financial settings. It will also introduce students to behavioral and experimental methodologies in finance, economics and other disciplines.

Management Information System

The MIS concentration, like a major, focuses on the use of information technology for value creation in new and established firms. This concentration equips students with the perspectives and skills to understand the role of IT in organizations, to identify opportunities for IT-enabled business innovations, and to design, develop, and deliver the technology infrastructures that enable firms to effectively use IT for value creation.

The MIS concentration courses adopt an interdisciplinary approach that integrates technical concepts with business concepts to enable students to develop the knowledge, perspectives, and skills needed for a career in information systems. Students develop the capability to understand business requirements and translate them into technology needs and the skills to design and implement application systems, databases, and web-based systems. They also develop critical proficiency in areas such as project management and team-based development.

- **MGMT 4150 – IT Project Management (4 credits) (S)**

This capstone concentration course provides the student with conceptual and applied material focusing on the effective implementation of information. A central theme underlying this course is that information system implementation is best thought of as a bridge between systems design and utilization and that it must be understood in the context of the development process as a whole. This course examines a wide array of interrelated issues not generally covered in a systems analysis and design course including: process development life cycle; project management and systems engineering; process reengineering and maturity; organizational learning and evaluation.

- **MGMT 6090 – Enterprise IT Integration (F) Not offered in Fall 2020**

This course explores a multitude of approaches to IT integration among the various departments of a corporation as well as between the corporation and entities in its external environment. It explores multiple integration methods at the data level, the process level, and the application level. Once the student acquires a strong understanding of these basic methods then the course continues with advanced methods of IT integration. Such methods include Service Orientated Architectures (SOA), Fast Business to Business methods, Middleware methods, Cloud Computing, Supply Chain, and the Portal based integration. The course is case study taught using the latest case studies from various consulting companies as they have actually implemented solutions for their corporate customers. A student cannot receive credit for both the graduate and undergraduate versions of this course.

- **MGMT 6570 - Advanced Data Resource Management (F,S)**

The primary objective of this course is to introduce the multifaceted role of data as a resource of the organization, in three ways. First, it examines the role of data at the operational, tactical, and strategic levels of the organization. Second, it provides students with knowledge and hands on training of technologies that manipulate data, including structured query language (SQL), extraction transformation and loading tools (ETL), data warehousing (DW), online analytical processing (OLAP), and data mining (DM). The course exposes students to big data management techniques. Finally, the course provides students the theory and hands on training to understand the transformation of data to information.

- **MGMT 6080 – Networks, Innovation and Value Creation (F)**

This course considers the evolving new models of value creation and business growth being introduced across different industries and examines such critical issues as product and process technology strategy, operational innovation, IT strategies and infrastructures, networks and organization, and finance. Utilizing a series of case studies from across a range of industry networks, students will have a chance to learn how companies can participate in such networks and what unique business resources and capabilities they can employ to enhance their probability of commercial success.

- **MGMT 6720 – Internet Marketing (S)**

Technology is a vital link in how modern corporations identify, acquire, transact with, and keep their customers. This course provides an introduction to both the technology infrastructure most relevant to the customer relationship as well as marketing issues that result from the application of computers and communication networks. Topics include issues related to social media, search, online advertising, blogging, customer relationship management, online market segmentation, and marketing of IT products.

Marketing – New Product Development

This elective set is available to students interested in a career path in new product development or in marketing and product management, and is geared toward the special challenges associated with developing and marketing high-tech products. Students focus their attention on understanding the links between a product's design, and the manufacturing and selling/marketing efforts necessary for achieving successful product/market development, commercialization, and management throughout the life cycle.

- **MGMT 6800 – Consumer Behavior and Product Design (F)**

This course introduces the motivations and related factors that shape consumers' purchasing decisions. Also considered is the consumer perceptual process and how it affects purchasing behavior and consumer reaction to product designs. The relationship between perception and product design is extended to topics such as design for understanding, universal product design, aesthetics, and industrial design.

- **MGMT 6530 – Making Business Happen (F)**

Analyze the process of identifying prospective markets and customers, developing channels, defining the value proposition, selling products and services, and managing a sales force. Learn about tools ranging from customized consultative sales to commodity, brokering, customer relationship management systems to trade press articles. Develop the skills to effectively listen, recognize opportunity, verbally persuade, handle objections and prospect. Develop an understanding of customer needs, approach strategies and effective presentations.

- **MGMT 6540 – Marketing Communications and Branding Strategy (S)**

Advanced study of the promotion management process including market situation analysis, media selection, spending plans, copy strategy, and advertising research methods. The focus is on integrating promotion strategies with buyer needs in terms of unifying brand strategies. Other brand elements include product conceptualization, distribution strategies, and new communication technologies.

- **MGMT 6550 – Marketing Research (F)**

* Pre-requisite: MGMT 6100 or permission of instructor

Marketing strategy decisions are developed in the framework of many case studies. Marketing research techniques, including questionnaire development and data analysis, are introduced and utilized in a team project.

- **MGMT 6720 – Internet Marketing (S)**

Technology is a vital link in how modern corporations identify, acquire, transact with, and keep their customers. This course provides an introduction to both the technology infrastructure most relevant to the customer relationship as well as marketing issues that result from the application of computers and communication networks. Topics include issues related to social media, search, online advertising, blogging, customer relationship management, online market segmentation, and marketing of IT products.

- **MGMT 6690 – Negotiation (S)**

This course is designed to help develop essential expertise in managing negotiations that occur in a broad array of settings. Students will learn to recognize types of negotiation, and gain proficiency in helping to shape beneficial outcomes. Students will develop negotiate skills experientially using a variety of exercises and case students while implementing useful analytical frameworks.

Supply Chain Management

The supply chain management concentration, like a major, focuses on the design and management of supply chains in manufacturing and service industries. This concentration equips students with the perspectives and skills to design supply chains, develop strategies to optimize supply chain operations, and identify opportunities for deploying IT to create effective demand fulfillment capabilities in firms.

- **ISYE 4220 – Optimization Algorithms and Applications (S)**

Design, analysis, and implementation of algorithms for combinatorial optimization problems. Introductions to theoretical analysis of algorithms and applications that can be formulated as combinatorial optimization problems. Specific topics include complexity analysis, network flow problems, traveling salesperson problems, matching problems, knapsack problems, and greedy algorithms. Implementation of combinatorial algorithms in a commercial software language. An introduction to this software language will be given at the beginning of the course.

- **ISYE 6600 – Design of Manufacturing System Supply Chains (F/S)**

Dynamics of manufacturing systems and supply chains, lean manufacturing, lead time reduction in manufacturing and service operations, advanced pull systems, concurrent design of products and supply chains, rapid new product introduction, remanufacturing and reverse supply chains, and integration of information technology in supply chain operations. Analysis of models and their application to design and planning problems in manufacturing as well as service systems is emphasized.

- **MGMT 6460 – Modeling and Optimization (F)**

This graduate level course is designed to provide the student with an understanding of the applications of quantitative models, methods, algorithms, and computational techniques across business functions. You will investigate how to apply optimization methods using a hands-on implementation approach.

- **MGMT 6090 – Enterprise IT Integration (F) Not Offered in Fall 2020**

This course explores a multitude of approaches to IT integration among the various departments of a corporation as well as between the corporation and entities in its external environment. It explores multiple integration methods at the data level, the process level, and the application level. Once the student acquires a strong understanding of these basic methods then the course continues with advanced methods of IT integration. Such methods include Service Orientated Architectures (SOA), Fast Business to Business methods, Middleware methods, Cloud Computing, Supply Chain, and the Portal based integration. The course is case study taught using the latest case studies from various consulting companies as they have actually implemented solutions for their corporate customers. A student cannot receive credit for both the graduate and undergraduate versions of this course.

- **MGMT 6080 – Networks, Innovation, and Value Creation (F)**

This course considers the evolving new models of value creation and business growth being introduced across different industries and examines such critical issues as product and process technology strategy, operational innovation, IT strategies and infrastructures, networks and organization, and finance. Utilizing a series of case studies from across a range of industry networks, students will have a chance to learn how companies can participate in such networks and what unique business resources and capabilities they can employ to enhance their probability of commercial success.

- **MGMT 6490 – Competitive Advantage and Operations Strategy (F)**

This course includes topics such as manufacturing as a competitive weapon; management of quality; manufacturing technology implementation; strategic impact of advanced manufacturing technologies; and manufacturing's role in new product development.

Technological Entrepreneurship

The technological entrepreneurship concentration has been developed for students who have an interest in new venture creation by starting their own company. Students following the technological entrepreneurship concentration may elect to take courses focused on entrepreneurship and related topics. These courses cover subjects associated with founding a new business entity, often referred to as a start-up. Students may elect to draw from a number of electives that best suits their academic and career objectives.

Students choosing this option must take:
- **MGMT 6620 – Introduction to Principles of Technological Entrepreneurship (S)**

An introductory graduate course in initiating new technology based business ventures and developing them into self-sustaining and profitable enterprises. Examines the process whereby a person decides to become an entrepreneur, screens opportunities, selects an appropriate product/market target and obtains the necessary resources. Provides the theoretical and practical knowledge for the preparation of format

business plans. Students enrolled in the full-time MBA program cannot use this course on the Plan of Study. This course is intended for students enrolled in the part-time MBA, M.S. in Management, or those seeking degrees in other schools at Rensselaer.

And three from the following list:

- **MGMT 6640 – Invention, Innovation and Entrepreneurship (F)**

Creativity is the starting point for technological entrepreneurship. Through interaction with faculty and guest speakers, students increase their understanding of the creative process and some of the tools that can be implemented to stimulate and/or manage individual and collective creativity. In addition, through application of these techniques in course activities, students explore and attempt to enhance their own creativity.

- **MGMT 6690 – Negotiation (S)**

This course is designed to help develop essential expertise in managing negotiations that occur in a broad array of settings. Students will learn to recognize types of negotiation, and gain proficiency in helping to shape beneficial outcomes. Students will develop negotiate skills experientially using a variety of exercises and case students while implementing useful analytical frameworks.

- **MGMT 6260 - Entrepreneurial Finance (S)**

The overall objective of this course is to understand how entrepreneurs and investors create value, noting that their interests do not always coincide. This involves learning about topics which trace out the "venture capital cycle;" opportunity recognition; valuation and evaluation; negotiation; structuring financing contract; managing investment; exit strategy. This course is structured into three modules: valuation, private equity market, and harvesting entrepreneurial value. A student cannot receive credit for both the graduate and undergraduate versions of this course.

- **MGMT 6530 – Making Business Happen (S)**

Analyze the process of identifying prospective markets and customers, developing channels, defining the value proposition, selling products and services, and managing a sales force. Learn about tools ranging from customized consultative sales to commodity, brokering, customer relationship management systems to trade press articles. Develop the skills to effectively listen, recognize opportunity, verbally persuade, handle objections and prospect. Develop an understanding of customer needs, approach strategies and effective presentations.

- **MGMT 6630 - Starting Up A New Venture (S)**

An understanding of the critical issues related to starting up a new business is gained through team-based experiential learning. Small teams of students develop a comprehensive business plan that can be used to raise money for a new or relatively new venture. The experiential learning process is enhanced through team meetings with faculty and/or course advisers and through oral presentations to the entire class. A student cannot receive credit for both the graduate and undergraduate versions of this course.

- **MGMT 6670 - Practicum in Technological Entrepreneurship (S) Not offered in Spring 2021**

* Pre-requisite: MGMT 6620

Provides students with opportunities to learn by text, discussion, and practical fieldwork, how successful new technological ventures are created, developed, and financed. Students work alone or in small teams with guidance from experience entrepreneurs. Students wishing to take this course are required to do so in their first year of study.