## **Electives**

**Finance/Economics electives**

**Big Data in Capital Markets**

Capital markets generate enormous amounts of real-time data. Algorithms that exploit the big data to provide trading signals are extremely valuable and lucrative. Students will learn about high frequency trading and the challenges of analyzing huge amounts of data in real-time. Algorithms and data storage and retrieval techniques commonly used on Wall Street will be studied.

**Financial Systems**

Financial systems are the centerpiece of well-oiled financial markets and are extremely complex. Students will learn the basics of financial systems design. Different types of systems, from risk management systems to algorithmic trading systems and their nuances will be discussed.

**Financial Risk Management**

This course will give students an overview of financial risk management. Students will get a broad understanding of market risk, credit risk and operational risk and how data science techniques are applied in the field of risk management.

**Financial Modeling**

This course will cover standard financial models in the areas of corporate finance, portfolio management and valuation of options and other securities. Various techniques such as Monte Carlo simulation and optimization will be covered. Implementation of these models in Excel or R will be covered.

**Derivatives and Alternate Investments**

This course covers the characteristics, risks and valuation of financial derivatives. A wide range of derivatives from futures to credit derivatives and other exotic derivatives are explained in this course.

**Analysis of Debt Investments**

This course covers the characteristics, risks and valuation of Fixed Income Securities. A wide variety of fixed income securities from bonds to interest rate derivatives and mortgage derivatives are considered in this course.

**Management electives**

**Supply Chain Analytics**

This course will provide students with a thorough understanding of supply chain analytics such as location decision, inventory control, quality assurance (QA), quality function deployment (QFD), supplier selection, and multi-criteria decision making. Supply Chain Analytics is one of the crucial business areas using business intelligence applications and dealing with Big Data. Students will be exposed to aforementioned critical and effective techniques used in supply chain management. Students will also be exposed to data-driven decision making processes and data handling including processes of gathering, storing, manipulating, analyzing, and visualizing data within and intra organizations. This course will prepare students for the supply chain analytics and supply chain management areas of the supply chain professional certifications and data analysts.

**Optimization and Decision Modeling**

This course will introduce optimization modeling including linear, integer, non-linear models for optimization. The course will use graphical analysis, simplex methods, and branch-and-bound and other methods. The course further investigates queuing theory, simulation, and transportation and inventory models. Additional topics include critical path methods and project evaluation and review technique (CPM-PERT) and decision tree as well as multi-criteria decision making techniques such as data envelope analysis (DEA) and analytic hierarchy process (AHP). Students will use state-of-the-art software for optimization with big data. Students will develop decision models and conduct sensitivity analysis to apply results and implications to business decision making. The course will prepare students for certified analytics professionals.

**Strategic Human Resource Management**

Strategic human resource management will be explored in this course, examining employees as “investments,” identifying trends that affect human resources management practices, describing what strategic HR is (particularly in contrast to more traditional approaches to HR), and look at how both the design of work systems and relevant employment laws influence the practice of managing people in organizations. The course will further examine strategic issues related to staffing, training, performance management, compensation, labor relations, employee separation, and managing a global workforce. Within the scope of the course, students will practice reading for comprehension, purposeful writing for academic papers, and oral expression of clear concepts and the application of theory. Readings will be assigned for each week’s class. We will hold class discussion, role playing and in-class debates regarding topical ethical issues. Everyone will be engaged in researching, writing, and presenting one or more academic paper. There will be significant emphasis on the refinement of the broad skills necessary for successful management in a firm. To that end, we will focus on reading for comprehension, computer literacy, writing, oral communication, presentation, and critical thinking.

**Project Management and Analytics**

This course will provide students with a thorough understanding of project management with analytics. For successful project management, students will integrate data analytics and principle and theory of project management in line with practical case studies. The students will have opportunities to use skill sets such as probability distribution, analytic hierarchy process and analytic network process, lean six-sigma, and simulation modeling for project management. The students will have a realistic group project using data analytics and real public and private datasets considering time, budget, and resource constraints during the course. This course will prepare students for the project management professionals and certified analytics professional.

**Marketing electives**

**Digital Marketing**

Digital marketing is a field where data analysis techniques are widely used. This course will give an overview of data science techniques in the field of digital marketing.

**Big Data in the Retail Industry**

The retail industry produces large amounts of data on customer buying patterns etc. The retail industry is at the fore front of big data analytics currently. This course will cover the big data techniques used in the retail industry to make decisions.

**Customer Relationship Management**

The transactions that customers generated with the company as well as the company’s communications with the customer created large amounts of data. This course will cover the current techniques such as CLV, BG/BB model that are used to deal with the customer data.

**Advanced Probability Models and Bayesian Analysis in Marketing**

This course will provide students with the advanced probability models as well as the Bayesian data analysis that are applied to deal with different kinds of research problem in marketing.

**Accounting electives**

**Big Data and Accounting**

This course will introduce students to the application of big data techniques in the field of accounting.

**Auditing and Data Analytics**

This course will give students a good understanding of using data analysis in the field of public auditing and internal auditing.

**Big Data Ethics and Governance**

This course will explore the ethics behind the use of Big Data. Issues around privacy and confidentiality of data and transparency of data will be discussed. Governance issues around big data will also be addressed.

**Forensic Accounting and Big Data Analytics**

Students will learn about the use of Big Data techniques in the field of forensic accounting, to detect white collar crime and fraud.