The Business Intelligence and Analytics (BIA) minor is designed to enhance the skill set of both business and arts & sciences majors so that they are fundamentally better equipped to succeed in a data-intensive world. Organizations typically gather information in order to assess their operating environment to conduct marketing research or customer relationship management, and to perform competitor analysis. Organizations accumulate business intelligence in order to gain sustainable competitive advantage and regard such intelligence as a valuable core competence.

Master of Science in Business Intelligence and Analytics program prepares students to be leaders in their organizations who can leverage organizational knowledge and find success in their data. This focus prepares 21st century professionals to drive organizational performance in all functional areas by using data to develop new opportunities, gain competitive advantage, identify effective strategies, and improve decision-making.

Most disciplines offered within a business school have a very clearly defined path. Students who study business intelligence and analytics at Saint Joseph's University take a different approach. The breadth of subjects explored within the BIA programs uniquely prepare students for careers in technology management and management consulting.

Job prospects and potential salary for our graduates and pay are excellent. Our programs were developed by industry for industry. BIA programs are designed for people who want to distinguish themselves from their peers by acquiring a set of essential skills that really make a difference in today's organizations.

**Professor:** Rashmi Malhotra Ph.D.; Ronald Klimberg Ph.D.; Virginia Miori Ph.D.

**Associate Professor:** John Yi Ph.D.; Kathleen Campbell Garwood Ph.D.; Nicolle Clements Ph.D.; Vipul Gupta Ph.D.

**Assistant Professor:** Marcello Balduccini Ph.D.; Ruben A. Mendoza Ph.D.; Silviya Valeva Ph.D.; Sina Shokoohyar Ph.D.

**Visiting:** Flavia Burton MBA; Janine Guerra J.D.; Vivian M. Evangelista M.S.

Chair: Virginia M. Miori, Ph.D.

### Undergraduate Program

- **Business Intelligence & Analytics** (https://academiccatalog.sju.edu/business/decision-system-sciences/minor-business-intelligence-analytics/
- **Machine Learning for Business Applications** (https://academiccatalog.sju.edu/business/decision-system-sciences/minor-machine-learning-business-applications/)

### Graduate Program

- **Master of Science in Business Intelligence and Analytics** (https://academiccatalog.sju.edu/business/decision-system-sciences/ms-business-intelligence-analytics/)

### Undergraduate Minor

- **Undergraduate Minor**
  - Business Intelligence & Analytics (https://academiccatalog.sju.edu/business/decision-system-sciences/business-analytics-intelligence-major/)
  - Machine Learning for Business (https://academiccatalog.sju.edu/business/decision-system-sciences/machine-learning-business-applications-major/Applications)

### Adult Undergraduate Program

- **DSS 100 Excel Competency (1 credit)**
  Mastering Excel is a critical for students as they enter the workforce. In Excel Competency, students will learn basic, intermediate and advanced Excel skills including financial, accounting, statistical, and decision making. The course will explore the use of excel in all fields of the business school. Students will be provided with instruction and short videos for reinforcement and review.
  **Attributes:** Undergraduate

- **DSS 150 Data Visualization (3 credits)**
  The human mind can handle significant amounts of information, but is not able to process the large masses of data required for business decision-making. There is a vast number of data processing and visualization technologies, tools, and techniques available to business users, but it is important to first understand how human consumers of information receive and interpret it. This class uses an interdisciplinary approach to examine methods for data presentation which are more meaningful to users. Students will learn a variety of concepts related to information gathering, processing, and presentation, and have some practice with a data visualization tool. Course activities draw from various disciplines including information systems, computer science, cognitive psychology, economics, graphic design, and research methods to examine and evaluate information. Students will present and analyze data sets in graphical form and explain their findings via written, oral, and visual presentations.
  **Attributes:** First-Year Seminar, Undergraduate

- **DSS 200 Intro to Information Systems (3 credits)**
  Information systems play a critical operational, tactical and strategic role in global businesses. Technology has both a direct and indirect impact on how firms do business, where they do business, and on the products and services they market. In this course, the dynamic and ongoing impact of technology on business operations is examined at the industry, corporate, and individual levels. Topics examined include the effect of technology on business processes, services, and products, the supply chain, customer relationship management, decision-making, knowledge management, communications, outsourcing, information security, and the ethical use of technology.
  **Attributes:** Undergraduate

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**Undergraduate Major**

- Business Intelligence & Analytics (https://academiccatalog.sju.edu/business/decision-system-sciences/business-analytics-intelligence-major/)
- Machine Learning for Business (https://academiccatalog.sju.edu/business/decision-system-sciences/machine-learning-business-applications-major/Applications)
DSS 210 Business Statistics (3 credits)
This course covers probability concepts as well as descriptive and inferential statistics. The emphasis is on practical skills for a business environment. Topics include probability distributions, estimation, one-sample and two-sample hypothesis testing, inferences about population variances, and chi-square test of independence. Students will also become familiar with spreadsheet applications related to statistics and with statistical software.
Attributes: Undergraduate

DSS 220 Business Analytics (3 credits)
Every organization, must manage a variety of processes. In this course the student will development an understanding of how to evaluate a business process. Additionally, the art of modeling, the process of structuring and analyzing problems so as to develop a rational course of action, will be discussed. The course integrates advanced topics in business statistics—linear and multiple regression and forecasting, production and operations management—linear programming and simulation, and project management. Excel software is used for problem solving.
Prerequisites: DSS 210
Attributes: Undergraduate

DSS 315 BIA Concepts & Practices (3 credits)
This course is an introduction to various scientific viewpoints on the decision-making process. Viewpoints covered include cognitive psychology of human problem-solving, judgment and choice, theories of rational judgment and decision, and the mathematical theory of games, and these topics will be focused in the field of Business Intelligence and Analytics, with systems theory as an overarching theme. Latest academic research and industry practice will be presented by guest speakers to motivate the topic an enhance learning.
Prerequisites: DSS 200
Attributes: Undergraduate

DSS 321 Project Management (3 credits)
This course introduces students to project management – an important skill for every student to successfully identify, plan, execute, monitor and close-out projects. Topics covered include introduction to project management, project selection and prioritization, project chartering, organizational capability, leading and managing project teams, stakeholder analysis and communication planning, scheduling projects, resourcing projects, budgeting projects, risk planning, quality planning, project supply chain management, determining project progress and results, and finishing projects and realizing benefits. Throughout the course, students will gain valuable project management experience by working in small groups.
Attributes: Undergraduate

DSS 325 Open Source Program Lang (3 credits)
As data volume grows across industry and government, techniques to manage and use this data are critical. In this course, we learn the use of open-source programming languages, such as Python, that make it possible to deal with the demands placed on us by big data. The course covers topics including variables, input and output, compound data types, conditionals and branching, functions, recursion, data dictionaries, exception handling, and object-oriented programming. The course stresses good programming style and practical applications.
Prerequisites: DSS 220
Attributes: Undergraduate

DSS 330 Database Management (3 credits)
Databases help organizations store what they know. Everything from information about business partners to supply chain management data to customer/consumer behavior is stored in a database of some type. It is no exaggeration to say all investment in computer technologies over the past few decades has been made in order to enable the collection, storage, analysis, synthesis, and communication of data, and it is all facilitated by database systems. As such, databases are the foundational technologies for enabling business intelligence and analytics services and activities. Students in this course will be exposed to the theoretical underpinnings of database systems, their component technologies, enabling processes, and to current and emerging applications. Students will obtain basic hands-on experience with an end-user database application (MS Access), an open-sourced enterprise-level system (MySQL), and an understanding of the capabilities of all enterprise-level relational database management systems. The course is required of all students pursuing a Bi&A major or minor.
Prerequisites: DSS 200 or CSC 115 or CSC 120
Attributes: Undergraduate

DSS 335 Found of Supply Chain Mgmt (3 credits)
This course includes global supply chain (manufacturing and service), process analysis (with course project), aggregate planning, Economic Order Quantity Models (4 variations), planning models such as ERP (enterprise requirements planning), DRP (distribution resource planning), and MRP (manufacturing requirements planning). Students will also be provided with information on supply chain certificates.
Attributes: Undergraduate

DSS 350 SCM Purchasing and Sourcing (3 credits)
Costs associated with purchasing materials often account for as much as 80% of the final product cost. This means that even a small decrease in these costs can have a significant impact on the bottom line. Procurement involves a constant tension between decreasing costs and establishing cooperative relationships. Throughout this course, we will be grappling with these two opposing forces. We will be examining competitive and cooperative situations in a variety of supply chain settings in which performance depends on the interactions between a variety of decision-makers, including customers, suppliers, competitors, and government regulators.
Prerequisites: DSS 335
Attributes: Undergraduate

DSS 360 CPIM Certification (3 credits)
This course includes content needed to pass the exam for Certified Supply Chain Professional (CSCP) offered by the Association for Supply Chain Management. Topics include SC design and strategy, procurement and delivery of goods, supply chain partner relationships, reverse logistics; measure, analyze and improve supply chains; compliance with standards, and risk management.
Prerequisites: DSS 335
Attributes: Undergraduate
DSS 370 Insurance Data & Analytics (3 credits)
A revolution is well underway in statistics: "Data & Analytics", "Big Data", and "Data Science" are now embraced as the new table stakes in data analysis. Given the quantitative nature of risk, the risk management professional is well-positioned to partner with other disciplines to advance the potential of these concepts to benefit the insurance industry. In order to be a participant in the conversation, however, the risk management professional should have knowledge of the language, practices, tools and techniques of the technology supporting this revolution.
Prerequisites: DSS 210 and RMI 200
Attributes: Undergraduate

DSS 415 Data Wrangling & Visualization (3 credits)
Data Wrangling is the process of transforming and/or mapping data from its "raw" initial collected form into another format with the intent of making it more appropriate and valuable for a variety of downstream purposes such as analytics and visualization. In this course, you will learn how to import, clean, structure, and effectively display data. Underlying data, in many business applications, comes from multiple sources and may have missing values and inconsistencies that need to be rectified. Data visualization is an interdisciplinary field that deals with graphically representing that data. It is a particularly efficient way of communicating when the data is numerous in size (rows and/or columns) and also in multiple formats (quantitative, qualitative, geographical, etc.). Data cleansing and wrangling will then allow the creation of realistic, insightful, and comprehensible data visualizations, while avoiding misleading techniques. Through discussion, individual research, and hands-on use of cutting-edge tools (including: Alteryx, Excel, and Tableau), we will develop knowledge and skills that will be immediately applicable in any analytics field. Hands-on projects are used throughout the course to allow students to see immediate results of the tools and techniques learned.
Prerequisites: DSS 220
Attributes: Undergraduate

DSS 420 Introduction to Data Mining (3 credits)
The "business intelligence" wave has quickly spread throughout the business sector. This wave begins with canned reports, through query & reporting, data warehouse/marts, online analytical processing (OLAP), then to data mining. This course discusses how data mining techniques are used to transform large quantities of data into information to support tactical and strategic business decisions. While the student will be introduced to data mining techniques, the focus of the course is learning when and how to apply data cleaning, appropriate methodology, and more importantly read and process output meaningfully in business applications and explain the output clearly and concisely without analytics jargon. The aim of this course is to provide the student with the foundation to data mine and understanding of the data mining process. It includes an introduction to some advanced statistical decision-making tools, including several multivariate data mining techniques, factor/principal component analysis, cluster analysis, ANOVA, multivariate regression, and logistic regression.
Prerequisites: DSS 220
Attributes: Undergraduate

DSS 425 Analytics Cup (3 credits)
The Analytics Cup course is an annual competition in which teams will solve a real-world problem situation utilizing their Business Intelligence (BI) and/or Business Analytics (BA) skills. During the course, all the students will learn about new BI and BA techniques and software, such as Trade Promotion Optimization (TPO), text analytics, and optimization. Each team will dig deeper into the application of one or more these software packages to solve their real-world problem situation. The competition culminates where each team presents their solution to a panel of judges who select the SJU Analytics Cup Champions.
Prerequisites: DSS 420
Restrictions: Enrollment is limited to students with a major, minor, or concentration in Business Intelligence. Analytics.
Attributes: Undergraduate

DSS 430 Alternative Risk Financing (3 credits)
The course focuses on the theory and practice of evaluating the value impact of risk financing options. The course covers simulating risk distributions, evaluating retention and transfer strategies, evaluating risk financing options (after-tax, NPV), off-shore financing, role of reinsurance, forecasting risk loss, capital market functions, forming captive insurance companies. The course's projects rely heavily on Excel as a tool to evaluate and model risk financing options – using both simulated and real-world data. Group projects also utilize Access to create relational databases of risk data for analysis. This course is aligned with the risk management industry designation exam, ARM 56. This course is also approved under The Institutes Collegiate Studies for CPCU program. DSS 330 is recommended for this course, but is not a required prerequisite.
Prerequisites: DSS 220 and RMI 301
Attributes: Undergraduate

DSS 435 Advanced Business Analytics (3 credits)
This course extends several of the foundation Business Analytics topics from DSS 220 to address more complex problem solving situations. Techniques to be covered are optimization models (linear programming, integer programming, non-linear programming and others), simulation models, optimization/simulation models, and decision analysis. These techniques will all be presented in the context of real world problems. To improve the students’ ability to develop such models, fundamental problem solving skills of modeling and process analysis will be developed.
Prerequisites: DSS 220
Attributes: Undergraduate

DSS 440 Six Sigma Apps & Foundations (3 credits)
This course presents an introduction of Six sigma and its vocabulary, coverage of business statistics focusing on hypothesis testing, multiple regression, experimental design, analysis of variance, statistical process control, analytic hierarchy process, discrete event simulation and other tools of six sigma. This course includes roughly the material covered on the yellow belt/green belt certification examination.
Prerequisites: DSS 220
Attributes: Undergraduate

DSS 445 Statistical Programming Lang (3 credits)
The goal of this course will be to use R's command line interface (CLI) to build familiarity with the basic R toolkit for statistical analysis and graphics. Specifically, students will learn good programming practices to manage and manipulate data, become familiar with some of R's most commonly used statistical procedures, and apply knowledge of data mining techniques (Multivariate Statistics, Regression, ANOVA, Cluster Analysis, Logistic Regression) for complex data sets using R.
Prerequisites: DSS 420 or MAT 423 or ECN 410
Attributes: Undergraduate
DSS 447 Resilient Supply Chains (3 credits)
Supply chains have historically been optimized with respect to costs and other specific attributes, including the provisioning of materials, manufacturing processes, and distribution logistics. This highly optimized network of exchanges is therefore sensitive to sudden or extreme changes in demand, such as those experienced during the COVID-19 pandemic. This course introduces students to bleeding-edge techniques for making supply chains more resilient. Specific topics include methods for the identification of critical dependencies and for the evaluation, verification and restoration of properties of the supply chain.
Prerequisites: DSS 335
Attributes: Undergraduate

DSS 451 Machine Learning for Bus I (3 credits)
This course will introduce Artificial Intelligence (AI) and Machine Learning (ML) applications and methods in Business. The course will begin by exploring terminology, basic concepts and definitions in AI/ML and move on to understanding what AI can and cannot realistically do. A variety of ML methods will then be introduced. The Python Programming language will be used to analyze data using these methods (starting with a mini-bootcamp to review programming concepts). Frequent use of real-world business case studies will be made in order to help connect these concepts to business applications.
Prerequisites: (DSS 325 or CSC 115 or CSC 133) and (DSS 420 or MAT 424)
Attributes: Undergraduate

DSS 455 Machine Learning for Bus II (3 credits)
This course will build upon the methods learned in DSS 451 and will also introduce some of the most popular Machine Learning Algorithms currently. This will include Neural Networks and Deep Learning, which are one of the fastest growing and widely used ML algorithms in the industry. The Python Programming language will be used to analyze data using these methods. Frequent use of real-world business case studies will be made in order to help connect these concepts to business applications.
Prerequisites: DSS 451
Attributes: Undergraduate

DSS 460 Geographic Information Systems (3 credits)
This course introduces students to Geographic Information Systems and Science (GIS) - a rapidly growing field concerned with examination, description, analysis, management, visualization, and mapping of geographic data. Topics covered include map design, geographic and projected coordinate systems, spatial data structures and models, spatial analysis, and more. Students will learn fundamental GIS techniques for spatial analysis using ESRI's ArcGIS software package. The course is computer-intensive though no computer programming background is required.
Prerequisites: DSS 200 and DSS 220

DSS 465 Supply Chain Analytics (3 credits)
This course covers concepts useful in efficiently managing the transformation of materials, labor, and capital into products or services. Topics covered include: Demand Forecasting, Demand/Supply Integration, Capacity planning, SAP Analytics Cloud (for forecasting), Excel (for Forecasting), Visualization. The level of discussion varies from long-term strategic planning to daily control of business processes.
Prerequisites: DSS 220
Attributes: Undergraduate

DSS 470 DSS Special Topics I (3 credits)
Content of this course varies to allow for ongoing changes to business intelligence and related fields. The instructor will provide the course description for a given semester.
Attributes: Undergraduate

DSS 471 DSS Special Topics II (3 credits)
Content of this course varies to allow for ongoing changes to business intelligence and related fields. The instructor will provide the course description for a given semester.
Attributes: Undergraduate

DSS 490 Internship I (3 credits)
DSS 491 Internship II (3 credits)
DSS 492 Internship III (3 credits)
DSS 493 Independent Study I (3 credits)
DSS 494 Independent Study II (3 credits)

DSS 492 Internship III (3 credits)
Enrollment is limited to Graduate level students.

DSS 493 Independent Study I (3 credits)
Restrictions: Students in the MBAEX program may not enroll. Graduate level students may not enroll.

DSS 494 Independent Study II (3 credits)
Restrictions: Students in the MBAEX program may not enroll. Graduate level students may not enroll.

DSS 509 Curricular Practical Training (1 credit)

DSS 581 Business Statistics (2 credits)
This course is designed to help students develop skills in applying quantitative techniques in solving business problems and decisions. Topics include descriptive statistics, statistical inference, and regression and correlation analysis. Students will use the tools from the DSS Tools and Concepts module and build upon them to solve more complex and realistic problems.
Restrictions: Students in the MBAEX program may not enroll. Graduate level students may not enroll.

DSS 582 Research Skills (2 credits)
This course is designed to help students develop a working knowledge of the business research process. Topics include proposal development, research design, survey design, collection and analysis of data, and presenting results. Practice is provided in carrying out a practical research project of limited scope. This course will provide an application of some of the concepts in the Business Statistics course.
Prerequisites: DSS 581
Restrictions: Enrollment limited to students in the MBAEX program.

DSS 583 Data Analytics & Techniques (2 credits)
This course continues the DSS module with the examination of more advanced decision models used in management science for solving complex business problems. It will provide an appreciation of the wide range and complexity of decisions faced by managers in the different functional areas. Topics covered will include the art of modeling, aggregate planning, and decision making under uncertainty and risk. This module will also cover the concepts and tools of forecasting, simulation, Data Mining (in conjunction with the Business Intelligence Module) for support of Customer Relationship Management (CRM) and business analysis.
Prerequisites: DSS 581
Restrictions: Enrollment limited to students in the MBAEX program.

DSS 588 Business Statistics (2 credits)
Enrollment is limited to Graduate level students.
DSS 584 Business Intelligence (1 credit)

DSS 585 Data Visual & Perf Analyt (2 credits)
This course introduces the concept of creating meaningful performance measures, identifying key performance indicators, graphic design, and best practices in data visualization through short hands-on projects. Students will work to understand best practices for visual design of performance dashboards to communicate, rather than dazzle, understand current software and uses, and leverage modern tools to discover stories within the data. Emphasis will be placed on learning how to present critical information that provides insightful and actionable results. By the end of the course, students will also be prepared to take the Tableau certification exam and the Qlik Sense certification exam.
Restrictions: Enrollment is limited to students with a major in Executive MBA Program (1 -year) or Executive MBA Program. Enrollment limited to students in the MBAEX program.

DSS 591 Data Analytics (2 credits)
The overall purpose of this course is to provide an introduction to the basic concepts of inferential statistics, which are important tools to support data-driven decision-making. Your ability to identify situations where these techniques may be effectively applied and to appreciate their potentials as well as their limitations to solving complex business problems will be developed. The methodology of each technique will be developed and applied in a real business context. Problems of increasing complexity will be used to emphasize problem description and definition. Emphasis will be placed on the interpretation and implementation of computer-generated results using Excel.
Restrictions: Enrollment is limited to Graduate level students.

DSS 592 Business Statistics (2 credits)
This course is designed to help students develop skills in applying quantitative techniques in solving business problems and decisions. Topics include descriptive statistics, statistical inference, and regression and correlation analysis. Students will use the tools from the DSS Tools and Concepts module and build upon them to solve more complex and realistic problems applied to the food and pharmaceutical industries.
Restrictions: Enrollment is limited to Graduate level students.

DSS 593 Forecasting (2 credits)
This course is a comprehensive survey of the commonly used techniques in sales forecasting. Three major categories of forecasting approaches will be presented. These include quantitative methods, time series and correlation techniques. Shortcuts, rules of thumb, and things to avoid will be discussed. Case studies will be presented, and students will be expected to do forecasting on simulated data sets.
Prerequisites: DSS 592
Restrictions: Enrollment is limited to students with a major, minor, or concentration in Food Marketing or Pharmaceutical Marketing. Enrollment is limited to Graduate level students.

DSS 594 Data Analytics (2 credits)
This course provides the student with a fundamental understanding of the potential and implementation of business analytics/business intelligence into an organization. To demonstrate this opportunity a few data analytics techniques are examined, so as to provide some insight into how these tools maybe used to analyze complex business problems and arrive at a rational solution.
Prerequisites: DSS 592
Restrictions: Enrollment is limited to Graduate level students.

DSS 591 Data Analytics (2 credits)
DSS 584 Business Intelligence (1 credit)

DSS 592 Business Statistics (2 credits)
DSS 593 Forecasting (2 credits)

DSS 600 Found for Bus Intel & Analyts (3 credits)
This course provides an overview of operations for the student new to business. It is broken into three major component parts. The first is the introduction of operations. We examine the relationship between strategic and tactical decisions and the overall impact on the company in both manufacturing and service operations. The second part is focused on the management of processes and providing the necessary tools to understand the flow of information and materials in a business setting, including forecasting and describing arrival and service processes. The third part examines the supply chain through presentation of the supply chain strategies and sustainability.
Restrictions: Enrollment limited to students in the MSBI program. Enrollment is limited to Graduate level students.

DSS 610 Business Analytics (3 credits)
The aim of this course is to provide the student with an understanding of several analytics techniques and to provide some insight into how these tools may be used to analyze complex business problems and arrive at a rational solution. The techniques to be studied are data visualization, forecasting, linear programming, decision analysis and simulation. Cases of increasing complexity will be used to emphasize problem description, definition, and formulation. The computer will be used extensively throughout the course, primarily by using available programs to perform the calculations after the problem has been correctly formulated. Emphasis will be placed on the interpretation and implementation of results. In addition, we will examine the current/future of analytics. Students must complete the ALEKS online Statistics Proficiency module before enrolling in DSS 610.
Restrictions: Enrollment is limited to Graduate level students.

DSS 615 Python Programming (3 credits)
Python is an open source programming language that focuses on readability, coherence and software quality. It boosts developer productivity beyond compiled or statically typed languages and is portable to all major computing platforms. This course is designed as an introduction to python programming and the characteristics that make it unique. Student will learn the use of the python interpreter, how to run programs, python object types, python numeric types, dynamic typing, string fundamentals, lists and dictionaries, and tuples and files.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 620 Con & Pract of DSS Modeling (3 credits)
Building on the background of previous courses, this course will extend the use of spreadsheet modeling and programming capabilities to explore decision models for planning and operations using statistical, mathematical, and simulation tools.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 630 Database Mgmt Theory & Pract (3 credits)
Business Intelligence rests on the foundation of data storage and retrieval. In this course, students will be presented with the theory of operational database design and implementation. The concepts of normalization, database queries and database application development will be introduced using contemporary tools and software such as SQL for program development.
Prerequisites: DSS 600 and DSS 610
Restrictions: Enrollment is limited to Graduate level students.
DSS 640 Managing Data Intelligence (3 credits)
The objective of this course is to introduce the students to business analytics technologies with a major emphasis on advanced data management technologies such as data warehousing and distributed systems. Further, the course also focuses on illustrating various analytics techniques and their applications. In addition, the course also provides students an illustration of how organizations employ data intelligence to make decisions or to gain a competitive edge.
Prerequisites: DSS 610 and DSS 630
Restrictions: Enrollment is limited to Graduate level students.

DSS 650 Process Simulation & Analysis (3 credits)
Using contemporary software tools, students will learn to break down the steps of business process analysis and design. They will first build process maps, and then use queueing theoretic concepts to statistically characterize arrival and service times. They will build simulation models in multiple software applications, and complete hypothesis tests to determine the significance of differences in scenarios.
Prerequisites: DSS 660 and DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 655 Optimization Modeling (3 credits)
This course provides the student with a deeper understanding of several optimization methods, such as linear programming, integer linear programming, multiple objective, and nonlinear programming. and provide some insight into how these tools may be used to analyze complex business problems and arrive at a rational solution.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 660 Introduction to Data Mining (3 credits)
This course in the Business Intelligence Program will extend the concepts of data mining to an exploration of a contemporary Data Mining tool set on a large live data set. In this course, students will be encouraged to find the patterns in the data and to prepare reports and presentations describing the implications of their findings.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 665 R Statistical Language (3 credits)
The goal of this course will be to use R's command line interface (CLI) to build familiarity with the basic R toolkit for statistical analysis and graphics. Specifically, students will learn good programming practices to manage and manipulate data, become familiar with some of R's most commonly used statistical procedures, and apply knowledge of data mining techniques (Multivariate Statistics, Regression, ANOVA, Cluster Analysis, Logistic Regression) for complex data sets using R.
Prerequisites: DSS 610 and DSS 660
Restrictions: Enrollment is limited to Graduate level students.

DSS 670 Data Visual & Perf Analyt (3 credits)
This course introduces the concept of creating meaningful performance measures, identifying key performance indicators, graphic design, and best practices in data visualization through short hands-on projects. Students will work to understand best practices for visual design of performance dashboards to communicate, rather than dazzle, understand current software and uses, and leverage modern tools to discover stories within the data. Emphasis will be placed on learning how to present critical information that provides insightful and actionable results. By the end of the course, students will also be prepared to take the Tableau certification exam and the Qlik Sense certification exam.
Restrictions: Enrollment is limited to Graduate level students.

DSS 675 Decision Analysis/Game Theory (3 credits)
This course introduces decision making techniques for systems operating under uncertainty and a set of analytical tools used to study the strategic interactions of individuals and institutions. The course covers probability and Bayesian inference, basic concepts of decision theory, decision tree, static and dynamic games (under complete and incomplete information). Applications include cooperation, price setting under imperfect competition, trust and reputation building, bargaining, auctions, signaling, and matching markets.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 680 Predictive Analytics (3 credits)
This course extends the data mining process to the predictive modeling, model assessment, scoring, and implementation stages. In this course, professional data mining software and small and large data sets will be used to effectively analyze and communicate statistical patterns in underlying business data for strategic management decision making.
Prerequisites: DSS 610 and DSS 660
Restrictions: Enrollment is limited to Graduate level students.

DSS 690 Special Topics Course (3 credits)
Prerequisites:
Restrictions: Enrollment is limited to Graduate level students.

DSS 693 Independent Study I (3 credits)
Enrollment is limited to Graduate level students.

DSS 694 Special Topics (1 credit)
Enrollment is limited to Graduate level students.

DSS 710 Six Sigma Apps & Found (3 credits)
This course prepares the student for the Six Sigma Green Belt certification examination. Topics include the Six Sigma dashboard and related models (DMAIC, DMADV, DFSS: QFD, DFMEA, and PFMEA), selecting and managing projects, organizational goals, lean concepts, process management and capability, and team dynamics and performance.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 720 Bus Analytics: Supply Chain Mgt (3 credits)
Management of supply chains is critical to the success and profitability of all businesses, whether manufacturing or service companies. This course examines supply chains and the business analytic tools which are most effective in developing supply chain efficiencies and supply chain value. Topics include supply chain strategy, network and system design, operations management, sourcing, logistics, forecasting, inventory management, relationship management and sustainable supply chain management.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 730 Web Analytics (3 credits)
This course explores the methods used to measure the performance of websites, mobile applications, social platforms, and complementary digital marketing techniques. We use common tools like Google Analytics and Tag Manager to measure and promote your own websites. Emphasis is on the application of these methods to support digital marketing investment decisions and the continuous improvement of digital properties in practice.
Restrictions: Enrollment is limited to Graduate level students.
DSS 740 Analytics w/ Machine Learning (3 credits)
Machine learning is a branch of computer science and related artificial intelligence methodologies that can "learn" how to perform useful tasks from prior data. This course teaches students different machine learning techniques such as statistical pattern recognition, supervised and unsupervised learning, regularization, clustering, decision trees, neural networks, genetic algorithms, and Naïve Bayes and illustrates how to implement learning algorithms using machine learning software packages. Students will learn to apply these techniques to analyze data collected from systems and processes of interest, with the purpose of uncovering dependencies, and identifying patterns and behaviors of interest.
Prerequisites: DSS 610 and DSS 615

DSS 750 Fundamentals of Cyber Security (3 credits)
This course introduces students to the interdisciplinary field of cybersecurity by discussing the evolution of information security into cybersecurity, cybersecurity theory, and the relationship of cybersecurity to nations, businesses, society, and people. Students will be exposed to multiple cybersecurity technologies, processes, and procedures, learn how to analyze the threats, vulnerabilities and risks present in these environments, and develop appropriate strategies to mitigate potential cybersecurity problems.
Prerequisites: DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 760 CPS Framework (3 credits)
This course introduces students to the CPS Framework, which was developed by the National Institute of Standards and Technology (NIST) in an effort to facilitate a shared understanding of cyber-physical systems, their foundational concepts and their unique dimensions. Cyber-physical systems are smart systems that include interacting networks of physical and computational components. They are widely recognized as having great potential to enable innovative applications and impact multiple economic sectors in the worldwide economy. Through the use of a shared vocabulary, the CPS Framework facilitates a thorough analysis of complex systems and processes, the uncovering of dependencies, weaknesses, risks, and the identification of corrective actions, both within the cyber domain and outside of it.
Prerequisites: DSS 610

DSS 770 Special Topics (3 credits)
Content of this course varies to allow for ongoing changes to business intelligence and related fields. The instructor will provide the course description for a given semester.
Restrictions: Enrollment is limited to Graduate level students.

DSS 790 Adv Topics: Cyber Analytics (3 credits)
Content of this course varies to allow for ongoing changes to cyber analytics and related fields. The instructor will provide the course description for a given semester.
Prerequisites: DSS 610