**DECISION & SYSTEM SCIENCES (DSS)**

**DSS 150 Freshman Seminar (3 credits)**
First Year Seminars will have varying topics.
*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*

**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 develop 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 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)**
The course provides an in-depth understanding of the database environment. Besides covering the important process of database design, this course comprehensively covers the important aspects of relational modeling including SQL and QBE. Students will be required to design and develop a database application using a modern fourth generation language system.
*Prerequisites: DSS 200 or CSC 120*
*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 should have knowledge of the language, practices, tools and techniques of the technology supporting this revolution. 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 420 Introduction to Data Mining (3 credits)**
This course focuses on the application of decision-making tools used to develop relationships in large quantities of data for more than two-variables. Comprehension of when to use, how to apply, and how to evaluate each methodology will be developed. This course will additionally provide an introduction to data mining tools. Data Mining consists of several analytical tools, such as neural networks, decision trees, evolutionary programming, genetic algorithms, and decision trees, used to extract knowledge hidden in large volumes of data. An understanding of how these data mining tools function will be developed so as to provide insight into how to apply these tools. Statistical and data mining software will be used.
*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. Students must be either a DSS major or minor.

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

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 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 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. Students may take this course without having taken DSS 220.

Prerequisites: DSS 200 and DSS 220
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. Students may take this course without having taken DSS 220.

Prerequisites: DSS 200
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 500 Math for Grad Business Studies (1 credit)

Various mathematical concepts are explored in reference to making business decisions. Topics include methods to solve systems of linear equations, matrix operations, and derivatives. A review of basic algebraic concepts such as quadratic formula, scientific notation, and graphing techniques is also covered.

Restrictions: Enrollment is limited to Graduate level students.
**DSS 509 Curricular Practical Training (1 credit)**

This course will include all of the content usually found in a business statistics course. This includes probability, probability distributions, confidence intervals, hypothesis testing, ANOVA, Chi Square, and Linear Regression. The course will be conducted through the use of ALEKS online learning software and will also meet virtually each week. The software allows students to obtain credit for concepts, which they already know and then provides learning tools to complete the remainder of the course. Students may waive this course by achieving a minimum score of 80% on the proficiency exam.

**Prerequisites:** HSB Waiver with a score of DS500 or DSS 500

**Restrictions:** Enrollment is limited to Graduate level students. Enrollment limited to students in the Haub School of Business college.

**DSS 525 BI and Analytics Foundation (3 credits)**

This course is designed to provide an integrative foundation in the field of business intelligence at the operational, tactical, and strategic levels. Topics such as value chain, customer service management, business process analysis and design, transaction processing systems, management information systems, and executive information systems will be covered, along with other topics relevant to the field of business intelligence.

**Restrictions:** Enrollment is limited to Graduate level students.

**DSS 545 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.

**Prerequisites:** DSS 560 or DSS 610

**Restrictions:** Enrollment is limited to Graduate level students.

**DSS 560 Business Analytics for MBA (3 credits)**

This course will focus on the modeling process of identifying, analyzing, interpreting, and presenting results, so as to transfer the data into decisions, will be examined. The statistical basis for decision-making will be reviewed. Descriptive statistics, confidence intervals, and hypothesis are covered with an emphasis on analyzing and interpreting results using Excel. Students will learn to utilize advanced managerial decision-making tools, such as optimization and stimulation, to analyze complex business problems, and arrive at a rational solution. For each of the analysis techniques, the methodology will be developed and applied in a real business context. Cases of increasing complexity will be used to emphasize problem description, definition, and formulation.

**Prerequisites:** DSS 510 or HSB Waiver with a score of DS510

**Restrictions:** Enrollment is limited to Graduate level students.

**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:** Students in the MBAEX program may not enroll. Graduate level students may not enroll.

**DSS 583 Decision Making 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:** Students in the MBAEX program may not enroll. Graduate level students may not enroll.

**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. Prerequisite: DSS 591
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 600 Found for Bus Intel & Analyts (3 credits)
This course provides a complete operations overview 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. We discuss 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. 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 for MSBIA (3 credits)
The aim of this course is to provide the student with an understanding of several management science 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 forecasting, linear planning, simulation, and modeling. 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 future of analytics. This course is required in place of DSS 560 for those students concentrating in Business Intelligence.
Prerequisites: DSS 600
Restrictions: Enrollment limited to students in the MSBI program.
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 600 and 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 600 and 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 Enterprise(Distributed) Data (3 credits)
Traditional database design concentrates on the functional areas of business and their database needs. At the strategic and value chain levels, we look at data across the enterprise and over time. The issues of Enterprise Data in the Data Warehouse, Data Marts, Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM), Online Analytical Processing (OLAP), and the concepts of Data Mining will be surveyed in this course.
Prerequisites: DSS 600 and DSS 610 and DSS 630
Restrictions: Enrollment is limited to Graduate level students.

DSS 650 Process Simulation & Analysis (3 credits)
Using the case study approach in combination with contemporary software tools, students will apply the concepts of business process analysis and design, quality control and improvement, performance monitoring through performance dashboards, and balanced scorecards and process simulation.
Prerequisites: DSS 600 and 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 600 and 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 600 and DSS 610 and DSS 660
Restrictions: Enrollment is limited to Graduate level students.
DSS 670 Critical Perform Management (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 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 600 and DSS 610 and DSS 660
Restrictions: Enrollment is limited to Graduate level students.

DSS 690 Special Topics Course (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.
Prerequisites: DSS 600 and DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 694 Special Topics (1 credit)

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 600 and 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 600 and DSS 610
Restrictions: Enrollment is limited to Graduate level students.

DSS 730 Web Analytics (3 credits)
This course will explore the basics of web analytics, review web analytic tools (such as Google Analytics, etc.), study the methodologies of analyzing websites, and learn to use web analytics to guide marketing strategies on the web.
Prerequisites: DSS 600 and DSS 610
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 Naive 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 600 and DSS 610 and DSS 615

DSS 750 Fundamentals of Cyber Security (3 credits)

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 750

DSS 770 Special Topics (3 credits)

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.