Operations & Analytics (OPAN)

OPAN 1101 Computational Busn Model 1 Credit
The course has the following objectives: 1) Define Business Information Systems. 2) Introduce basic concepts related to Data and Model integration for decision making. 3) Cover the following introductory statistical concepts: a. Measures of Central Tendency (Mean, Median, Mode). b. Measures of Dispersion (Range, Variance, Standard Deviation). c. Measures of Shape (Symmetry, Skewness). d. Presenting Quantitative Data using Frequency Distribution Tables and Histograms. e. Summarizing Qualitative Data. f. Generating a Trend Line using the Method of Least Squares with Solver. 4) Provide a comprehensive Excel foundation for use in future MSB courses, such as: a. Creating, Formatting, Auditing and Managing Worksheets and Workbooks. b. Using Built-in Statistical, Financial, Logical & Date Functions. c. Creating and Formatting Charts. d. Manipulating Data, and using Data Tables & PivotTables/Pivot Charts. e. Tools for managing a complex worksheet, such as Grouping, and Documenting. f. Making Decisions with Goal Seek, Scenario Manager & Solver.
Level: Undergraduate
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: ECON 1457
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, International Business, International Business, International Business, International Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment limited to students in the McDonough School of Business college.

OPAN 2101 Business Statistics 3 Credits
This course introduces the basic concepts of Statistics and their application in managerial decision-making. In the first part of the course, we consider the steps of data collection, preliminary data analysis (numerical and graphical), probability and uncertainty, statistical inference. In the second part of the course, we examine statistical model building for the purposes of understanding variability and making forecasts. A detailed development of multiple regression analysis is complemented by some study of time series analysis. The objective is to demonstrate the effectiveness of statistical modeling in guiding managerial decision-making. The statistical analysis of large data sets is an integral part of modern business practice. Accordingly, both spreadsheets and statistical software will be used throughout the course.
Level: Undergraduate
Prerequisites: (OPIM 170 (may be taken concurrently) or OPAN 1101 (may be taken concurrently))
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, International Business, International Business, International Business, International Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment limited to students in the McDonough School of Business college.

OPAN 2102 Statistical Models for Busines 1 Credit
Students are expected to be already familiar with data analysis, probability and uncertainty, and basic statistical inference. We examine statistical model building for business processes for the purposes of understanding variability and making forecasts. A detailed development of multiple regression analysis is complemented by some study of time series analysis. The objective is to demonstrate the effectiveness of statistical modeling in guiding managerial decision-making. The statistical analysis of large data sets is an integral part of modern business practice. Accordingly, both spreadsheets and statistical software will be used throughout the course. Note: This course is designed for students who already have taken a first course in statistics. Formerly offered as DSCI 172.
Level: Undergraduate
Prerequisites: (MATH 035 or MATH 1350)
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, International Business, International Business, International Business, International Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment limited to students in the McDonough School of Business college.

OPAN 2201 Modeling Analytics 3 Credits
Management Science is the application of quantitative modeling techniques to the managerial decision making process. The course will be taught by example and adopts a practical spreadsheet-based approach to the modeling of a wide variety of business problems from finance, marketing, and operations. The approach taken in this course concentrates on problem solving in an interdisciplinary context that also develops spreadsheet skills. Formerly offered as OPIM 284.
Level: Undergraduate
Prerequisites: (OPIM 172 or OPAN 2102) or (OPIM 173 or OPAN 2101) or (ECON 121 or ECON 2110) or (INAF 320 or INAF 3200) or (GOVT 201 or GOVT 2201) or (MATH 040 or MATH 1040) or MATH 04- or (MATH 140 or MATH 2140) and (MATH 035 or MATH 1350)
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: OPIM 284
Course registration restrictions:
Enrollment is limited to students with a program in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, International Business, International Business, International Business, International Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment is limited to Undergraduate level students.

OPAN 3101 Operations Management 3 Credits
A firm has the opportunity to create competitive advantage through proficient management of its operations—manufacturing and services. To do so, the firm must first recognize and establish the strategic role of its operations within the organization. Then, at the more detailed operational level, the firm must execute effectively and efficiently. This course examines the strategic role that the operations function can play, and offers specific tools and techniques that the firm can use during implementation. Formerly offered as OPIM 294.
Level: Undergraduate
Prerequisites: (OPIM 220 or OPAN 2201) or OPIM 284
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: OPIM 294

OPAN 3241 Data Science 1.5 Credits
This course will help students understand the techniques used in a data-informed business analysis to help leaders make smart business decisions. It will involve lecture and discussion of real-world problems as well as hands-on introduction to techniques and data types used to identify solutions. A significant amount of time will be spent on the process of data science to inform decision-making – the way to use data science concepts and approaches to answer outcome objectives.
Level: Undergraduate
Grading: Main Campus (UGrad, Grad)

OPAN 3242 Applied Data Viz for Sports 1.5 Credits
Enormous amounts of data are generated every day, and interpretation of descriptive statistics or statistical output alone is no longer sufficient for supporting robust, actionable decisions. Instead, effective decision making increasingly relies on understanding relationships, patterns, and insights in large data sets through well-designed data visualizations. This course introduces foundational principles of cognition and data visualization using sports as a rich and intuitive application domain. Students will learn how different types of data and relationships are best represented visually, how to tell a coherent and credible story with data, and how to ensure that visualizations accurately support analytic conclusions. To facilitate learning, Tableau will be the primary software used to create and communicate sports-related data visualizations.
Level: Undergraduate
Grading: Main Campus (UGrad, Grad)

OPAN 3243 Intro Bus App Dvlpmt in Python 1.5 Credits
In this introductory course, students will learn how to write practical business applications in the Python programming language. No prior programming experience is required. Throughout the semester, students will be immersed in hands-on programming projects and should emerge with marketable technology skills.
Level: Undergraduate
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: COSC 1010, COSC 010

OPAN 3244 Mgmt Bus App Dvlpmt in Python 1.5 Credits
In this course, students will explore business models and best practices involved in the production and management of application software. In addition to infusing software development best practices into prerequisite Python programming projects, students will propose and manage their own Python applications from ideation to delivery. By the end of the semester, students should emerge with marketable technology management experience.
Level: Undergraduate
Prerequisites: (OPIM 220 or OPAN 2201)(OPIM 243 or OPAN 3243) or (OPIM 243 (may be taken concurrently) or OPAN 3243 (may be taken concurrently)) or (COSC 010 or COSC 1010)
Grading: Main Campus (UGrad, Grad)

OPAN 3251 Information Tech Systems Man 3 Credits
Information technology (IT) has had a profound impact on many aspects of the business world. To understand the business world, managers today need to understand business data and information, and how to make decisions using them. Information is power in the business world today and it is essential to understand it. Information systems enable the collection, storing, analysis and dissemination of this vital information. As such, the content of this course is relevant for students in all business majors. This course informs students about the role of information technology in organizations and how to best exploit that technology. In order to provide students with in-depth learning, three core areas from the information technology field are covered in the course: strategic value of information technology, data and information, and electronic business. Each area includes a project and/or case to provide students with useful and practical skills and learning in the area.
Level: Undergraduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, International Business, International Business, International Business, International Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

OPAN 3256 Digital TechnologiesAnalytics 3 Credits
We have never lived in a time of faster and more transformative technological innovation. There is no industry that has been untouched by the emergence of technology and analytics and nearly all functional roles in business today must work with technology and data in some way. An understanding how and why technology and analytics is employed in business today—as well as the main concepts, tools, and techniques—is essential to be successful in a rapidly evolving, data-infused global business environment. This course will help students understand the tools and technologies used in modern, global organizations. It will involve lecture and discussion of real-world problems as well as hands-on introduction to tools and techniques used in technology and analytics. The course will not only cover the concepts, tools, and techniques widely used in business today but also how to apply the tools in business situations and to solve business problems.
Level: Undergraduate
Prerequisites: (OPIM 220 or OPAN 2201)(OPIM 172 or OPAN 2102) or (OPIM 173 or OPAN 2101)
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, International Business, International Business, International Business, International Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment limited to students in the McDonough School of Business college.

OPAN 3257 Develop/Managing Data Bases 3 Credits
A database is nothing more than a set of related information. A telephone book, for example, is a database of the names, phone numbers, and addresses of all people living in a particular region. With the explosion of data, computing power, and cloud data warehouses, SQL has become an even more indispensable tool for the savvy analyst or data scientists. This class reveals new and hidden ways to improve your SQL skills, solve problems, and make the most of SQL as part of your workflow. There are variant relational and non-relational databases. In this class, we will cover MySQL (relational database) and MongoDB (non-relational database). The dynamic nature of MongoDB lends itself quite naturally to working with a dynamic language such as Python. The tradeoffs between a dynamically typed language such as Python and a statically typed language such as Java in many respects mirror the tradeoffs between the flexible, document-oriented model of MongoDB and the up-front and statically typed schema definition of SQL databases. Python allows you to express MongoDB documents and queries natively, through the use of existing language features like nested dictionaries and lists. For these reasons, MongoDB and Python make a powerful combination for rapid, iterative development of horizontally scalable backend applications. For the vast majority of modern web and mobile applications, MongoDB is likely a better fit than RDBMS technology. The focus of this course is more on the NoSQL category.
Level: Undergraduate
Prerequisites: OPIM 250
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, International Business, International Business, International Business, International Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment limited to students in the McDonough School of Business college.

OPAN 3258 Decision Support Systems 3 Credits
This course will introduce students to decision support systems and their role in business. Specifically, the course will present a systematic way to think about decisions and formalize decision modeling in order to arrive at more informed choices and better outcomes. The emphasis of the course is on teaching students how to effectively model decisions along with teaching the practical skills needed for building decision support systems. The Visual Basic for Applications (VBA) programming language within MS Excel will be the tool used for building decision support systems. Class deliverables will be systems built with VBA Code.
Level: Undergraduate
Prerequisites: (OPIM 220 or OPAN 2201) or OPIM 284
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, International Business, International Business, International Business, International Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment limited to students in the McDonough School of Business college.

OPAN 3259 Project Management 3 Credits
This course provides an overview of project management. The course addresses (1) the culture, (2) the principles, and (3) the basic techniques of project management. The course reviews the general stages of a project in rough chronological order and describes how the stages interrelate. Basic tools of project management, such as work breakdown structure, scheduling, earned value analysis, and risk management, are introduced. The elements of project management critical to the success of a project also are identified and explained.
Level: Undergraduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, International Business, International Business, International Business, International Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

Enrollment limited to students in the McDonough School of Business college.

OPAN 3261 Analytics Advantage 1.5 Credits
Using analytics to solve complex business problems involves multiple steps, such as formulating the problem, gathering the necessary data, developing and analyzing a model to use the data, and finally deriving actionable insights from the analysis. In this course, we will take an integrative approach and discuss using data analytics and modeling tools to help with decision making. We will use Python and Excel as our main platforms. We will also discuss other software for larger problems where Excel's optimization capabilities may not be sufficient. While learning specific techniques and software packages is useful, we will highlight the fundamental ways analytical reasoning works independently of the tools we use. As application areas, we will look at problems in operations, marketing, and management.
Level: Undergraduate
Prerequisites: OPAN 2101 and OPAN 2201
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a program in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Business and Global Affairs, Business and Global Affairs, Business and Global Affairs, Business and Global Affairs, Business Studies, Business Studies, Business Studies, Business Studies, Finance, Finance, Finance, Finance, Global Business, Global Business, Global Business, Global Business, Intl Business, LangCulture, Intl Business, LangCulture, Intl Business, LangCulture, Intl Business, LangCulture, International Business, International Business, International Business, International Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Analytics, Operations Analytics, Operations Analytics, Operations Analytics, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt or Operations Information Mgmt.

Enrollment is limited to Undergraduate level students.

OPAN 3271 Environ Sustn Ops Bus Models 3 Credits
Companies are increasingly facing several new and urgent challenges affecting their operations and business models. The rising cost and scarcity of some raw materials is requiring firms to invest in operational efficiency and recapturing value post-use. Geographical disparities in water, climate and energy risks are inducing firms to proactively redesign their supply chains and operations. The global nature of supply chains, including presence in countries with weak regulation and institutions, requires firms to undertake a new approach to supplier management, and safeguard its reputation and access to resources. On the other hand, these challenges also represent opportunities for product differentiation, innovation, and eco-entrepreneurship. Responding to environmental considerations may provide firms with ways to do well while doing good. This course takes a holistic view of the interaction of operations and business models with the natural environment. There are many reasons why an organization would care about the interaction of their business with the environment. These include purely business-focused motivations such as potential cost reductions, liability or risk concerns, and ethical ones such as personal or institutional desire for stewardship. In this course, we will mostly utilize a business-oriented perspective by focusing on voluntary or economically-motivated sustainability considerations and initiatives. The course will cover various tools and frameworks that can aid managerial decision making in this context, and will introduce a broad range of environmental issues. We will focus mostly on the environmental dimension of sustainability, but also discuss the social dimension when relevant. Current issues such as global warming, e-waste, and social responsibility will be discussed in the context of a number of cases.
Level: Undergraduate
Prerequisites: (OPIM 220 or OPAN 2201) or OPIM 284
Grading: Main Campus (UGrad, Grad)

OPAN 3273 Bus Modeling Using Regression 1.5 Credits
This elective offers a review of the essential principles and techniques of Least Squares Regression analysis. It emphasizes the rudiments of a forward-thinking, yet applied, Regression modeling course for the MSB Undergraduates. The course is designed to and has the objective of providing a practical approach to business applications using regression modeling, but not at the cost of the needed essential conceptual foundation. Topics include: Review of Simple (quick); Multiple linear Regression; Multi-collinearity and model impact; Residual analysis and lack of fit; Non-linear Transforms; Deviating from LSR model assumptions: Normality; Heteroscedasticity; Diagnostics and influential observations (jack knife), residual correlation (autocorrelation) and Durbin-Watson. Time allowing, other topics like, Logit Regression, will be addressed.
Level: Undergraduate
Prerequisites: (OPIM 172 or OPAN 2102) or (OPIM 173 or OPAN 2101) or (ECON 121 or ECON 2110) or (INAF 320 or INAF 3200) or GOVT 201 or (MATH 040 or MATH 1040) or MATH 04- or (MATH 140 or MATH 2140)
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a program in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Business and Global Affairs, Business and Global Affairs, Business and Global Affairs, Business and Global Affairs, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

OPAN 3274 Time Series Forecasting 1.5 Credits
Business forecasting refers to the tools and techniques used to predict developments in business and management such as sales, expenditures, and profits. The purpose of business forecasting is to develop better business and management strategies based on informed predictions. Virtually every manager has to make decisions or plans that depend on forecasts. With the rising interest in data-driven decision making, statistical forecasting methods have become the main and standard tools to make effective forecasts in business applications. This course builds upon the basic forecasting models studied in the introductory statistics core class. The aim is to further develop statistical modeling skills for business applications, with particular emphasis on time series, which form the inputs for sales forecasting and production planning as well as much financial and economic activity. Through examining time series, we can identify trends and patterns that enable us to make forecasts and to ascribe to those forecasts an adequate measure of the uncertainty surrounding the forecasts. The course will focus primarily on quantitative methods for forecasting, ranging from purely extrapolative approaches to causal modeling and topics such as exponential smoothing, ARMA/ARIMA models and seasonality.
Level: Undergraduate
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: MATH 2645

OPAN 3277 Real Options Valuations 3 Credits

.

Level: Undergraduate
Grading: Main Campus (UGrad, Grad)

OPAN 3280 Global Supply Chain Management 3 Credits

"In his book, Edward Humes estimates that coffee beans can travel a distance greater than the Earth's circumference before they are used to make a cup of coffee. If even simple products have such long and complex supply chains, what about complex products, like phones and airplanes? Should supply chains for iPhones or Boeing 787 airplanes be structured, managed, and evaluated differently than supply chains for coffee or T-shirts? How? How do the supply chains of Google and Facebook look like? What about supply chains for vaccines? You should take this course to find out. By the end of the course, you will have learned through hands-on, practical examples, case discussions, simulations, and games about: 1) Supply chains taxonomies by demand and supply characteristics, and the importance of matching supply chains with the strategic objectives and business models, 2) Strategic, operational, and tactical activities in supply chains, 3) Metrics for evaluating supply chain operational and financial performance, 4) Key factors for network design, strengths and weaknesses of various distribution metrics, optimization framework for network design, 5) Inventory and capacity management analytic tools, key factors for making decisions, and key drivers of business value, 6) Types of forecasts, basic approaches to forecasting, analytics of forecasting, 7) Costs and benefits of global sourcing, the value of flexibility, postponement, risk diversification, 8) Effects of asymmetric information in supply chains, the role of misalignment of incentives, competition for limited resources, and how to align incentives using contracts and other methods 9) The best practices in Supply Chain Risk Management and Business Continuity Management frameworks, tools, and metrics, 10) The process for risk identification, analysis, and mitigation, qualitative and quantitative metrics of risk, the importance of information and transparency, novel technologies to create supply chain transparency, 11)The role of financial information in assessing supply risk, and 12) Best practices in crisis management, processes, and tools."
Level: Undergraduate
Prerequisites: (OPIM 230 or OPAN 3101) or OPIM 294
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to students with a major in Accounting, Accounting, Accounting, Accounting, Business Administration, Business Administration, Business Administration, Business Administration, Finance, Finance, Finance, Finance, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, Int'l Business Regional Stds, International Business, International Business, International Business, International Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Int'l Political Eco Business, Marketing, Marketing, Marketing, Marketing, Management, Management, Management, Management, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Operations Information Mgmt, Undeclared Business, Undeclared Business, Undeclared Business or Undeclared Business.

OPAN 4949 Tutorial: Decision Science 0-3 Credits

Level: Undergraduate
Grading: Main Campus (UGrad, Grad)

OPAN 5100 Business Analytics 0-1.5 Credits

Financial markets are information processing engines. They aggregate and produce enormous quantities of information. In an era where data-driven decision-making is crucial for effective regulation, this course provides participants with essential business analytics skills, focusing on data-driven decision-making and managerial models. Participants will learn to manage and evaluate models, focusing on performance metrics and cross-validation. Practical exercises using sample codes will demonstrate how to assess model outcomes and apply insights to support decision-making. Ethical considerations, including bias and fairness in models, are also emphasized.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 5500 Managerial Statistics 1 1.5 Credits

Did you ever notice that no matter where you stand on popular issues of the day, you can always find statistics or surveys to back up your point of view? There is an endless flow of information to help you make decisions, but is this information accurate, unbiased? Statistics means "numerical descriptions" to most people. Monthly unemployment figures, the failure rate of a new business, and the proportion of female executives in a particular industry all represent statistical descriptions of large sets of data whose characteristics we wish to estimate. The applications of statistics can be divided into two broad areas: descriptive statistics and inferential statistics. Statistical methods are particularly useful for studying, analyzing, and learning about populations of experimental units. In this course, you will learn data management and wrangling, summary measures, probability and probability distribution, and statistical inference. This course is based exclusively on R. R is open source and a powerful software that merges the convenience of statistical packages with the power of coding.
Level: Graduate, Undergraduate
Grading: Main Campus (UGrad, Grad)

OPAN 5505 Managerial Statistics 2 1.5 Credits

"This class builds on the foundations learned in Managerial Statistics 1. Moving on from descriptive and basic inferential statistics, we will learn methods of creating predictive models with statistics focusing on regression methods. Students will learn the fundamentals of simple, multiple, and nonlinear regression. Time-permitting, we will also discuss basic models for classification and data mining. Students will further enhance their skills in technology and its application throughout the course, as they continue to use statistical packages and learn new competencies in their technology lab. This class, in tandem with Managerial Statistics 1, will provide future business managers with the concepts and skills they need for success in all areas of the business world and will help them with managerial decision-making."
Level: Graduate, Undergraduate
Grading: Main Campus (UGrad, Grad)

OPAN 5510 Programming for Bus Analytics 1.5 Credits

This course introduces essential Python programming skills for students with no prior coding experience. Emphasis is on practical applications for business, including data analysis, automation, and visualization, alongside a basic review of Excel. Students will focus on using Python to address real-world business problems, gaining skills they can apply in areas such as analytics, finance, and operations.
Level: Graduate
Grading: Main Campus (UGrad, Grad)

OPAN 5515 Foundations of Modeling 1.5 Credits
This course introduces students to the foundational principles of quantitative modeling with a focus on practical applications in Excel and Python. The course is designed for students seeking to develop skills in building and analyzing models for a wide range of decision-making and problem-solving contexts. Students will begin by exploring Excel as a powerful platform for deterministic and probabilistic modeling. As the course progresses, students will be introduced to Python for more advanced modeling tasks. Through hands-on exercises and case studies, students will learn how to apply these tools to real-world situations, gaining insights into system behaviors, evaluating performance metrics, and informing decision-making under uncertainty.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 5600 Managerial Statistics 1.5 Credits
Statistics is the science and art of extracting useful information from data. It is both Descriptive and Inferential. While the former deals with methods of organizing, summarizing and presenting numerical data, the latter is concerned with methods for making inferences and drawing conclusions about characteristics of a population based on sample information. Managerial statistics introduces MBAs to concepts, methods, and techniques that are used extensively in business decision-making activities, both in the public and private sectors. The techniques introduced in this course are used in all functional areas of business, including accounting, finance, marketing, production and personnel management. These techniques and methods are tools for analysis, communication, and decision-making in the international business environment. Because the business environment is characterized by uncertainty, statistics also provides business managers with tools necessary to arrive at conclusions and to make decisions in uncertain situations.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Equivalent to OPAN 6500
Course registration restrictions:
Enrollment limited to students in the MBA-BADM, MBA-NMBA or MBA-NMBA-O programs.

OPAN 6505 Operations 1.5 Credits
Operations is a core function in every organization and the largest portion of assets and employees in most organizations are engaged in this function. How it is managed affects not only other functions, but the ultimate success of the entity. This course is designed to provide you with the key concepts and tools in managing this function.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6510 Analytical Problem Solving 1.5 Credits
Operations Research and Analytics enable organizations to turn complex challenges into opportunities. They transform data into information, and information into insights for making better decisions and improving results. There are three types of analytics: - Descriptive Analytics gives insight into past events, using historical data and provides an answer to the question: “What happened?” - Predictive Analytics provides insight on what will happen in the future and answers the question: “What should we expect to happen in the future?” - Prescriptive Analytics helps with decision making by providing actionable advice and answers the question: “How should we respond now given what could happen in the future?” In statistics, you learned tools for Descriptive and some tools for Predictive Analytics. In this course, you will learn the tools of Prescriptive Analytics. Specifically, in this course, you will learn and apply quantitative modeling for solving complex business problems and making better decisions. You will learn how to identify the most important data, consider all available options, weigh difficult tradeoffs, estimate risk, and apply the best decision tools. You will apply what you learn in your finance, operations, marketing, strategy, and other courses. You will learn how to understand results of quantitative analysis, how to draw qualitative insights from it, and how to communicate your findings. We will use Excel (and selected Excel Add-Ins) as the platform for building and using quantitative models and as an incidental benefit, you will become a more proficient Excel user.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6520 Project Management 1.5 Credits
This course addresses the culture, the principles, and the basic techniques of project management. The course reviews the general stages of a project in rough chronological order and describes how the stages interrelate. Basic tools of project management, such as work breakdown structure, scheduling, earned value analysis, and risk management, are introduced. The elements of project management critical to the success of a project also are identified and explained.
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6541 Intro ProgAnalytics in Python 1.5 Credits
Businesses rely on digital tools and technologies to perform operations, aid decision-making, and drive competitive advantage. In this course, students will create practical business applications and decision-support tools in the Python programming language. Students will gain experience working with Application Programming Interfaces (APIs) to fetch and process real-time financial and economic data from the Internet. Throughout the semester, students will be immersed in hands-on Python programming projects and should emerge with marketable technology skills. No prior programming experience is required.
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate or Juris Doctor level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6542 Analytics for Consulting 1.5 Credits
Working with data is inevitable. A recent McKinsey study showed that 43% of executives and managers across industries stated that data and analytics skills represent the largest talent gap in the ear future. This course will build upon the statistics and lab knowledge. Application of R and Tableau will allow students to understand how to work with data in the real world. During the six-week course, students will learn how to access, transform, join, filter, and visualize data to answer business questions. Students will understand the pitfalls that can occur when working with data and how to avoid them. Equally important is the ability to describe your analysis to your colleagues, clients, and stakeholders. Students will gain experience presenting analyses with a focus on being empathetic to their audience.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: OPAN 6556
Course registration restrictions:
Enrollment limited to students in the MS-MGTM program.

Enrollment is limited to Graduate level students.

OPAN 6551 Decision Support Systems 1.5 Credits
This course explores advanced topics in management support systems with a focus on decision theory. The course will present insights into key issues and problems in decision support information systems. The Visual Basic Applications (VBA) programming language within Microsoft Excel will be used as the primary tool to build basic decision support systems. Class deliverables will be systems built with VBA code.
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6552 Data Science for Bus Decisions 1.5 Credits
Much of business used to be conducted behind closed doors with people making decisions based on feel and qualitative experience. These decision-making processes still occur, but the advent of new computing possibilities, larger quantities of granular data, and an ability to tie analysis to outcomes has allowed business leaders, from team leads to CEOs, to make more nuanced, rational, and data-informed decisions. This course will help students understand the techniques used in a data-informed business analysis to help leaders make smart business decisions. It will involve lecture and discussion of real-world problems as well as hands-on introduction to techniques and data types used to identify solutions. A significant amount of time will be spent on the process of data science to inform decision-making – the way to use data science concepts and approaches to answer outcome objectives.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 6553 Data Mining 1.5 Credits
The objective of this course is to develop a framework for analyzing key problems in business analytics using the powerful and advanced tools of computer-based statistical analysis and the related concepts of data mining. This course will also (1) provide both a theoretical and practical understanding of the key methods of classification, prediction, reduction and exploration which are at the heart of data mining; (2) provide a business decision-making context for these methods; and (3) using real business cases, illustrate the application and interpretation of these methods. In short, this class will be data structure and analysis with advanced quantitative methods. No knowledge of database management will be assumed.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6554 Database Development Mgmt 1.5 Credits
MongoDB is one of the most popular database technologies for handling large collections of data. This class will help you develop the knowledge and skills to create databases and process data efficiently. You will earn the fundamentals of NoSQL databases with MongoDB: 1. set up and use MongoDB on the cloud, 2. insert, update, delete, and retrieve data from MongoDB, 3. build aggregation pipelines to perform complex queries, 4. optimize queries using indexes, 5. improve scalability and performance with sharding clusters, 6. replicate clusters, back up your database, and restore data, etc. This class dives into cloud computing from the very start. You will work on realistic projects that are presented as bitesize exercises and activities, allowing you to challenge yourself in an enjoyable and attainable way. By the end of this class, you will have the skills and confidence to process large volumes of data and tackle your own projects using MongoDB. Neo4j is the leading graph database platform that drives innovation and competitive advantage at Airbus, Comcast, eBay, NASA, UBS, Walmart and more. Thousands of community deployments and more than 300 customers harness connected data with Neo4j to reveal how people, processes, locations and systems are interrelated. Using this relationships-first approach, applications built using Neo4j tackle connected data challenges including artificial intelligence, fraud detection, real-time recommendations and master data. This class uses Neo4j in "predicting influence and communities using graph algorithms" and "improving ML predictions using connected feature extraction".
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 6555 Analytics Advantage 1.5 Credits
Using analytics for solving complex business problems involves many steps, such as formulating the problem, gathering the necessary data, developing and analyzing a model to use the data, and finally deriving actionable insights from the analysis. In this course, we will take an integrative approach and discuss using data analytics tools together with modeling tools to help with decision-making. We will use Python and Excel as our main platforms. We will also discuss other software for larger problems where Excel's capabilities may not be adequate. While learning specific techniques and software packages is useful, we will highlight the fundamental ways in which analytical reasoning works independently of the tools we use. As application areas, we will look at business problems involving demand estimation, resource allocation, and operational decision making.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6556 Applied Data Visualization 1.5 Credits
This course will cover basic ideas about cognition and data visualization including how different types of data and relationships should be presented, how to tell a coherent story with data, and how to ensure that the data tells the story instead of coercing the data to tell your story. To facilitate this, we will learn how to create visualizations in Tableau.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6557 Small Data 1.5 Credits
Small Data is an integral part of Business Analytics and it refers to two important concepts in practice: I. When solving a consulting problem, it is very common to have a small sized data set (say less than 30) in order to solve practical business situations. This data set may not be normal or fulfilled any data assumption, could be quantitative or qualitative. The data could be categories such a political parties, ranking such as customer preferences or continuous such as the time a customer wait in line at a credit card 800 numbers. II. Small data is also a new concept in Business Intelligence which appeared in late 2012, it is the opposite of Big Data and it is an innovative way to understand your customers' actions. It refers to all tidbit of information created by customers by means of customers' preferences, wearables devices and self-tracking. Think of all the digital tidbits consumers leave in their paths as they go through the day. Credit card payments, location fixes, newsletter signups, Facebook likes, tweets and Web searches. Small data are derived from our individual digital traces. Small data is generally small sample sized and not very normal distributed. Small data drive personalization. The aim of this class is to introduce advanced quantitative techniques for Business Analytics that will help you to make decisions in the best way to analyze real business data for small data.
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: MSFO 6836, MSFO 836
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6558 Bus Modeling Using Regression 1.5 Credits
This course provides the advanced yet extremely applied perspective on business statistics. Two specific topics account for the majority of its content: regression analysis and analysis of variance. Additional topics include deviating from model assumptions, multicollinearity, transformations, residuals and lack of fit, heteroscedasticity, detecting outliers/influential outliers: Jack Knife, detecting residual correlation: Durbin-Watson test, piece-wise linear regression, inverse prediction, and weighted least squares.
Level: Graduate, Undergraduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6559 Business Forecasting 1.5 Credits
Business forecasting provides a set of tools designed to develop better business and management strategies based on informed predictions. This course will examine the process of business forecasting, introduce several quantitative approaches to forecasting, and discuss newer innovations in forecasting practice. The course will include topics such as time series approaches, introductory causal modeling, and judgmental forecasting. The course will provide students with some hands-on experience with analyzing real world data using some statistical software packages.
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6567 Operations Strategy 1.5 Credits
A firm derives a competitive advantage either by achieving a cost advantage, or through product differentiation. That is, either the firm must be able to produce its goods at a lower cost, or it must offer features that customers desire and competitors lack. We explore specific operational strategies that the firm might pursue to achieve this superior process or product innovation. Within each topic, we develop a framework, or theory, that the firm can use as an aid in its decision-making process, and also tackle a real-life problem through a case study. The topics are as follows: Introduction: The Dynamics of Innovation; Competing Through Operations; Strategic Implications of the Learning Curve; Encroachment Strategies; Outsourcing; New Product Development; Strategic Quality Management; Capacity Management; Capacity, Flexibility and Timing; Path to Profitability; Value Creation in Private Equity.
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 6571 Environ Sustn Ops Bus Models 1.5 Credits
This course takes a holistic view of the interaction of operations and business models with the natural environment. There are many reasons why an organization would care about the interaction of their business with the environment. These include purely business-focused motivations such as potential cost reductions, liability or risk concerns, and ethical ones such as personal or institutional desire for stewardship. In this course, we will mostly utilize a business-oriented perspective by focusing on voluntary or economically-motivated sustainability considerations and initiatives. The course will cover various tools and frameworks that can aid managerial decision making in this context, and will introduce a broad range of environmental issues. We will focus mostly on the environmental dimension of sustainability, but also discuss the social dimension when relevant. Current issues such as global warming, e-waste, and social responsibility will be discussed in the context of a number of cases. Main Topics covered: 1. Business Case for Environmental Sustainability 2. Life-Cycle Analysis, Eco-Efficiency and Eco-Effectiveness 3. Corporate Environmental Programs 4. Environmental Risk Assessment and Management 5. Green Innovation, Product and Market Development 6. Supply Chain Sustainability and Responsibility 7. Circular Economy and Closing the Loop 8. Novel Business Models for Sustainability
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: EMBA 571, EMBA 6874
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 6572 Bus of Sustainable EnergyTech 1.5 Credits
Companies are actively seeking out innovative ways to generate economic value from sustainable energy sources and technologies. Several startups and established companies are adopting innovative business models to elevate their profits while also increasing the adoption of new technologies, such as rooftop solar panels and electric vehicles. Motivated by the ambitious goal of meeting their energy need entirely from renewable sources, such as wind and solar energy, large corporations are sourcing unprecedented levels of renewable energy. With a vision to increase reliable energy access in the developing world, several startups are implementing innovative solutions, including smart grids. This course analyzes these exciting developments in sustainable energy and technology. The primary objective of the course is to equip students with the tools and frameworks to assess economic and environmental viability of innovative business models for sustainable energy and technology. The course focuses on the current challenges and the opportunities associated with the transformation to a sustainable energy future.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Mutual exclusion: EMBA 672, EMBA 6877
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6575 Sustainable Business Practicum 1.5 Credits
Companies are increasingly facing several new and urgent challenges affecting their operations and business models. The rising cost and scarcity of some raw materials is requiring firms to invest in operational efficiency and recapturing value post#use. Geographical disparities in water, climate and energy risks are inducing firms to proactively redesign their supply chains and operations. The global nature of supply chains, including presence in countries with weak regulation and institutions, requires firms to undertake a new approach to supplier management, and safeguard its reputation and access to resources. On the other hand, these challenges also represent opportunities for product differentiation, innovation, and eco#entrepreneurship. Responding to environmental considerations may provide firms with ways to do well while doing good. This course provides you with an opportunity to work on a real#world problem related to sustainable business faced by a business, a non#governmental organization or an institution. You will work in teams on client projects, which will be curated by the instructor, and range across different topics and industries. You will not only be able to gain experience solving such problems but also integrate knowledge from your previous coursework related to sustainable business strategies. More generally, the course will also allow you to hone your problem#solving and consulting skills. Examples of such projects would include analyzing the economic or environmental potential of different business strategies related to business models, supply chains, or product development, developing marketing and communication plans for sustainability strategies, etc.
Level: Graduate
Prerequisites: (OPIM 571 or OPAN 6571)
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6580 Global Supply Chain Management 1.5 Credits
"In his book, Edward Humes estimates that coffee beans can travel a distance greater than the Earth's circumference before they are used to make a cup of coffee. If even simple products have such long and complex supply chains, what about complex products, like phones and airplanes? Should supply chains for iPhones or Boeing 787 airplanes be structured, managed, and evaluated differently than supply chains for coffee or T-shirts? How? How do the supply chains of Google and Facebook look like? What about supply chains for vaccines? You should take this course to find out. By the end of the course, you will have learnt through hands-on, practical examples, case discussions, simulations, and games about: 1) Supply chains taxonomies, 2) How to match supply chains with the strategic objectives and business models, 3) Strategic, operational, and tactical activities in supply chains, 4) Metrics for evaluating supply chain operational and financial performance 5) Inventory and capacity management analytic tools, key factors for making decisions, and key drivers of business value 6)Costs and benefits of global sourcing, the value of flexibility, postponement, risk diversification 7) Effects of strategic interactions in supply chains, 8) Effects of asymmetric information in supply chains, the role of misalignment of incentives, and solutions for aligning incentives, 9) The basics of in Supply Chain Risk Management, frameworks, tools, and metrics, 10) Current economic, political, health, technology developments and their effects on supply chain management"
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

Enrollment limited to students in a Master of Business Admin. degree.

OPAN 6581 Supply Chain Risk Management 1.5 Credits
A Supply Chain comprises firms and organizations, linked through material, information, and financial flows, and whose activities enable products to be created and reach the consumers. Supply Risk Management (SRM) is a set of methods and solutions for identifying, measuring, preparing for, and mitigating ramifications of adverse events in supply chains. In this course, we will define the scope of problems that can be addressed through supply chain risk management. We will learn about a range of SRM solutions used in practice, their correct applications, their relative benefits, and discuss relevant fundamental ideas underlying these solutions. In particular, we will study the importance of coordination of financial and operational decisions in supply chains, supply risks, the operational flexibility as a risk-mitigation tool, and the financial methods for pricing operational flexibility. We will learn about applications of quantitative risk management tools (risk measures, statistical models of uncertainty, Monte-Carlo simulation) and financial instruments (options, futures, insurance) to supply chains.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 6590 Digital Infrastructure 1.5 Credits
This course provides an introduction to digital infrastructure which consists of fiber, cell towers and data centers. The course will explore how the different components of digital infrastructure tie together to form the ecosystem for storing and processing data with a particular focus on the demand drivers for digital infrastructure. Lectures will provide a high level overview of the technology behind each of the components of digital infrastructure with a focus on the underlying business models of these components. Lectures will be delivered assuming the students are analysts of a buy side equity fund who are considering investing in the digital infrastructure sector. After each component of digital infrastructure has been reviewed, the remaining class will focus on the sustainability aspects and issues of digital infrastructure.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.

OPAN 6600 VisualztionStorytelling wData 1.5 Credits
Enormous amounts of data are created every day. Interpretation of descriptive statistics and statistical output is no longer sufficient for supporting robust actionable business decisions. Instead, managers should be relying on their strengths of understanding relationships, patterns, and potential insights from large data sets through proper visualization. This course will cover basic ideas about cognition and data visualization including how different types of data and relationships are best presented, how to communicate a coherent story with data, and how to ensure that the data accurately supports the story.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6601 Stats for Business Analytics 1.5 Credits
Statistics, being the science of collecting and analyzing data, provides numerous tools and concepts that can be used in the field of business analytics. This course provides students an introduction to foundational concepts needed to better understand the statistical tools in the data-related courses of the program. The emphasis of the course is to understand how statistical methods can be applied to problems and improve decision making in organizations through the appropriate use of statistics. The course aims to develop analytical thinking and illustrate appropriate use of these methods in practice. Topics include describing data, transforming data, understanding variation and uncertainty, hypothesis testing, measuring dependence and establishing associations, and inferential methods.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6602 Machine Learning Foundations 1.5 Credits
Machine learning refers to a set of tools for modeling and understanding complex datasets that builds on statistics and computer science. This course introduces the main tools developed in this field. The course first covers traditional regression methods where the dependent variable is either a continuous or a discrete variable. It then introduces students to resampling methods, such as cross-validation and bootstrap. Finally, it covers model selection and regularization methods. These include subset selection methods, shrinkage methods, and principal component regressions. The course will emphasize a rigorous treatment of the material as well as their practical implementation for business.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6603 Advanced Machine Learning AI 1.5 Credits
This course is a continuation of “Machine Learning I” and covers more advanced supervised learning methods as well as unsupervised learning methods. Among the supervised learning methods, the course starts with regression splines, smoothing splines and Generalized Additive Models (GAM). It then covers tree based methods such as CART, Boosting and Random Forests. Among the unsupervised learning methods, the course covers principal component analysis, k-means clustering and hierarchical clustering. The course will emphasize a rigorous treatment of the material as well as their practical business implementation.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6604 AI Modeling in Practice 1.5 Credits
Predictive Analytics is a subfield of business analytics that draws tools and techniques from data mining, machine learning and predictive modeling that aim to create models that can precut outcomes for uncertain events. In this course, we will build on earlier classes on statistical foundations and machine learning to enrich our set of tools for prediction. The first part of the course will include uncovering patterns, features and regularities in data to build powerful models for prediction. Topics will include association rules and dimension reduction. The second part of the course will focus on how businesses integrate these ideas to create models for successful prediction. Topics include regression trees, k-nearest neighbors, artificial neural networks, and support vector machines. This section will also cover ensemble modeling where predictions and classifications are made using combinations of models. The course will focus on the benefits, challenges and pitfalls of applying these concepts in practice and help students think analytically through the process of building, implementing and providing prescriptions from predictive models.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6605 Decision Modeling 1.5 Credits
Managerial decisions in complex environments can be analyzed using quantitative models. This course introduces students to spreadsheet modeling, simulation and optimization. Simulation models are helpful when making decisions under uncertainty and optimization models deal with many decision variables that interact with each other through constraints. The applications areas are diverse: airlines maximize their revenues by changing prices under demand uncertainty, hospitals improve quality of care by changing staffing levels, manufacturers minimize costs by reorganizing their supply chains to meet consumer demand. Students build models that generate insights for operations management problems and practice their skills in communicating such insights.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6606 Programming I: Intro to Data 1.5 Credits
In this course students learn how to write practical applications for business problems in a coding language. This course provides programming skills to create, clean and handle data for managerial decisions. The course covers basic programming topics such as data types, variables and constants, and their declaration, arithmetic operators, repetition control structures, basic file operations, elementary searching and sorting. Students will learn how to program in using R.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6607 ProgrammingII:Data Infrstrctre 1.5 Credits
This course focuses on Python and equips students with intermediate concepts in programming including object-oriented programming, common data structures, string manipulation, control statements and flow control, conditional logic, and user-defined functions. The course also focuses on using data processing, analysis, and visualization tools in Python such as pandas, seaborn, altair, and others. All concepts are demonstrated through business applications.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6608 Programming III: Massive Data 1.5 Credits
This course equips students with advanced concepts in programming that are important for working with massive data. This course builds upon and extends the Data Infrastructure course by considering advanced topics, including relational (SQL) and non-relational databases (NoSQL), big data management and architecture, distributed computing and big data processing engines such as Apache Spark, and the role of cloud computing in big data and analytics, among others. All concepts are demonstrated through business applications.
Level: Graduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 6609 Language Analytics 1.5 Credits
Only about 20 percent of the data available for businesses are in structured data, the other 80 percent are unstructured and in free text. This course will cover the major techniques for mining and analyzing text data to discover interesting patterns, extract useful knowledge, and support decision making, with an emphasis on statistical approaches that can be applied to text data.
Level: Graduate, Undergraduate
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment limited to students in the MS-BSAN-O program.

Enrollment is limited to Graduate level students.

OPAN 7949 Tutorial: OPAN 1.5-3 Credits
Level: Graduate, Juris Doctor
Grading: Main Campus (UGrad, Grad)
Course registration restrictions:
Enrollment is limited to Graduate level students.