

**Master of Science in Business Analytics (MSA)
Talent Analytics Track 2019-2020 Academic Year**

39 credits as follows:
18 common core credits
15 track required credits – as indicated by**
6 elective credits

May 2019 (subject to change)

Foundations Courses These courses are over and above the 39 required credits. Grades count towards GPA calculation. Required: MKT 500V Basics of R Programming (0.5) Choose one of: MKT 500R Basics of Statistics Using SPSS (0.5) MGT 574 Basics of Stata programming (0.5) MGT 573 Basics of SAS programming (0.5)	
Fall I	
A	B
<u>Required:</u> DAT 560G Database Design and SQL (1.5) <u>Track Required:</u> OB 527 Human Resource Strategies for General Managers (1.5)**	<u>Required</u> MGT 560F Managerial Communications (1.5) DAT 560M Big Data and Cloud Computing (1.5) DAT 500N Prescriptive Analytics (1.5) <u>Track Required:</u> MGT 500R Developing Human Resource Strategy (1.5)**
<u>Required:</u> DAT 500S Predictive Analytics for Business Decision-Making (3) DAT 561 Intro to Python and Data Science (3)	
Spring	
<u>Required:</u> MGT 561 Text Mining and Analysis (1.5) <u>Track Required:</u> MGT 538 Integrated Value Creation: The Wholonic Approach (1.5)** OB 500E Talent Analytics (1.5)**	<u>Required:</u> MGT 560N Introduction to Cybersecurity (1.5) <u>Track Required:</u> OB 535: People Metrics (1.5)** MGT 538B Compensation, Incentives, and Organization (1.5)**
MKT 500W Causal Inference (3) <u>Track Required:</u> HRM XXX: Practicum in Talent Analytics (3)**	

Fall II

Track Required:

MGT 502: Ethical Issues in Managerial Decision Making (1.5)**
OB 565 Leading Change (1.5)**

Electives:

MGT 511A Law and Business Management 3
MGT 460I Sports Business Analytics 1.5
OB 562A Leadership Competence
OB 523 Managing Power and Politics in Organizations 3
OB 500B Women in Leadership 1.5
OB 530 Leading the Creative Organization 1.5
MGT 572 Defining Moments 1.5
OMM 500D Project Management 1.5
MKT 523 Sales Management 1.5
MGT 567 Law, Business, and Governance 1.5
OB 524 Negotiation 3
Business Analytics Electives from other tracks

MSA - Talent Analytics Course Descriptions

Summer Foundations Courses – Required

MKT 500V Basics of R Programming

R has become the tool of choice for many data science and customer analytics professionals in every industry and field. It is not surprising to see a requirement for being familiar with R in job descriptions. R is very flexible in carry out data analysis. Part of the benefit of being open source is that many programmers/researchers are constantly introducing new statistical analysis tools into R through R packages. Given all the benefits, R does have a relatively steeper learning curve. To better prepare MSA students, we introduce this 2 day introduction to R programming course. This class will help you master the basics of R. We will start from the very beginning - installation of the program. No prior knowledge in programming is required. Through in class demonstration and lots of hands-on practice, by the end of the second day, you will have the chance to undertake your own data analysis and solve relevant business problems using R. 0.5 Credits. Graded Pass/Fail.

Summer Foundations Courses – Choose at least one of the following:

MKT 500R Basics of Statistics Using SPSS

This foundational course, which is a required course for students in the MSA program, will cover material that serves as useful preparation for courses offered in the Olin curriculum that rely extensively on applied statistical concepts (e.g., marketing research, advanced marketing research, database marketing, data analysis for brand management etc.). The course will provide students with both an overview of basic statistical concepts and a practical grasp of statistical analysis. Students will be trained to use SPSS, a popular statistical software package, in order to perform the statistical analysis. The course will also cover interpretation of results. 0.5 Credits. Graded Pass/Fail.

MGT 573 Basics of SAS Programming

Statistics using SAS serves as a technical basis for research and data analysis. This course will provide students with an overview of statistical knowledge and with a good practice of analysis techniques. Students will be trained to use SAS, one of the most commonly used tools in commercial analytics markets, to analyze data and interpret results. The course aims to prepare students for more advanced courses in data analytics. Graded pass/fail.

MGT 574 Basics of Stata Programming

As one of the most popular statistics software packages, Stata has served as an essential tool of data science in every industry and academia. The goals of the course are to better prepare students for success in future courses and careers. Students will be trained to obtain necessary technical skills of using Stata by the end of this two-day course. The introduction of Stata will be from the very beginning, and therefore there is no prerequisite required. Basic statistics foundations will be reviewed to facilitate the goals of the course. Graded pass/fail.

Required Core Courses

DAT 560G Database Design and SQL

Databases are at the foundation of every organization's information strategy. Understanding the structure of databases and mastering the tools to analyze data are essential skills in any role. The tools developed in this course assist students in implementing a company's data management strategy and developing well-grounded analytical recommendations. In this course we focus on understanding how data is structured in relational databases. With vast amounts of data available, from disparate sources, effective organization of the data is essential to its utilization. To complement this, we utilize SQL (Structured Query Language) as the primary tool to extract data for managerial reports and for advanced analytical models. Practical experience with current relational database software is developed throughout the course. This course is required for MS/CA students and priority will be given to SMP students. 1.5 Credits.

DAT 500N Prescriptive Analytics

This course covers optimization models and tools as they apply to the design and analysis of supply chains. Production planning, distribution, network design, and revenue management problems are covered using the methods of linear, non-linear, and integer programming. Upon successful completion of this course, students will demonstrate competency in formulating and solving supply chain optimization models of real-life complexity using state-of-the-art software. They will become proficient with industrial strength software tools like AMPL and Gurobi alongside Excel's Solver. The course emphasizes proficiency in model-building and using software tools rather than theory. 1.5 Credits

MGT 560F Professional Business Communication

Communication is the process of sending and receiving messages, however, communication is effective only when the message is understood and when it stimulates action or encourages the receiver to think in a new way. This course will introduce students to fundamental best practices in business writing and business speaking that will ensure effective communication. Students will participate in activities that will develop professional business communication skills in both writing and speaking. These will include: preparing, writing and delivering presentations, composing clear concise business messages in a variety of formats, understanding emotional intelligence to reach the audience and utilizing critical thinking as a basis for communication strategies. 1.5 Credits.

DAT 500S Predictive Analytics for Business Decision-Making

Predictive Analytics deals with the employment of formal learning from business experience, using business data, to predict the future behavior of customers or other critical organizational elements in order to drive better business decisions. This course emphasizes data situations that students are likely to face in marketing, finance, manufacturing and consulting jobs. Students will analyze real-world business datasets using various advanced analytic techniques such as logistic regression, decision trees, neural networks, stochastic gradient boosting, MARSplines, Ensembles, Clustering,

Associations etc. The focus of the course lies in the conversion of raw and messy business data in to robust actionable predictions for decision-making. 3 credits.

DAT 561 Introduction to Python and Data Science

This is a 3-credit course offered to MSBA students. It provides students the necessary skill set to extract reliable insights from large datasets prevalent in various business applications, such as supply chain management, marketplace operations, healthcare analytics and financial engineering, using Python. In this course, students will develop basic tools to understand Python programs and implement data processing pipelines using Python. In particular, students will learn how to acquire, clean, analyze and visualize data in Python, which they will then use to improve decision-making processes. Throughout the course, students will use the Python programming language, which is very effective for data manipulation, reporting, and complex optimization. Topics covered include introduction to Python programming, data acquisition and cleaning, data manipulation, current multi-source data collection technology used in practice, basic data visualization using Matplotlib, ggplot2 and Bokeh. 3 Credits.

DAT 560M Big Data & Cloud Computing

The growth in available data is a challenge to many companies. This presents an opportunity for companies to conquer the vast and various data available to them. The growth in data includes traditional structured data, as well as unstructured data created by both people and machines. It is essential for analysts to be comfortable in the new technologies and tools that are being developed to store, retrieve, analyze, and report, using the vast data resources available. This course introduces students to the technologies currently deployed to overcome the challenges of Big Data. Prerequisite: MGT 560G.

MGT 561 Text Mining

Consumers and companies constantly generate large amounts of unstructured or lightly structured texts on the web and offline: exchanges of consumer opinions on products and services on social media, transcripts of phone conversations with customer representatives, open-ended surveys, etc. By employing text analytics, businesses can derive at scale valuable insights into consumer attitudes to brands, competitive landscape, and customer relationships, among other applications. This course introduces students to the methods of mining, organizing, summarizing, and analyzing textual data with the objective of driving business decision-making.

In particular, the course will cover the following substantive topics:

- Sources of business-relevant text data and web crawling;
- Topic analysis;
- Sentiment analysis;
- Use of text in predictive modeling (churn analysis, predicting CTR with search terms);

The focus of the course is on understanding and hands-on implementation of relevant algorithms and techniques, but the course will provide the opportunity to use a number of (open-source) software tools.

MGT 560N Introduction to Cybersecurity

This course covers a broad range of cyber security terms, definitions, perspectives, concepts, and current trends with a focus on managing risk and the use of information and cyber security as

business enablers. Students will complete a cybersecurity analytics-related project as part of the coursework.

MKT 500W Causal Inference

This course introduces students to causal inference. The advance in information technology has given an enormous amount of valuable data to businesses. Data analysts and data scientists have become the cool kids due to high demand in data talents. In the meantime, however, artificial intelligence is getting better at finding correlational patterns in data. This means that AI may even replace some tasks performed by data scientists in the coming years.

The good news is that good data-driven decision making often goes beyond discovering correlations in the data. In particular, making the right prescriptive decisions often requires managers to tease out the causal relationship(s) between the prescriptions and outcomes of interest. Artificial intelligence has yet to show such abilities. Therefore, mastering causal inference is likely to become more rewarding over time as AI continues to complement human judgement with quick data analyses at a low cost.

Throughout the course, we will go over many examples of why understanding causal relationships is important. Spoiler alert: in one example, Lewis, Rao, and Reiley (2012) find that a naïve estimation could show that advertisement leads to an 870%--1,200% increase in consumers' likelihood of search for the advertised brand, while the true causal effect is 0. Imagine how disastrous it would be if companies make advertising decisions based on false causal inferences!

Our goals in the course are

- Use proper statistical tools to tease out the deterministic process that have generated the data in the presence of randomness.
- Become skeptical about claims of causality. You should be able to give alternative data generating processes that could have generated the same data.
- Understand that observational data come from agents' decisions, and that these decisions could lead to biased samples.
- Understand omitted variable bias and reverse causality
- Design and implement various statistical and experimental methods of addressing the basic causal-inference problem using statistical software.
- Dig deeper into the mechanisms (decision trees) that yield the causal relations.
- Articulate analyses in presentations.

3 Credits

Required Track Courses

OB 527, Human Resource Strategies for General Managers (1.5)

This course will provide a basic understanding of how to gain competitive advantage through developing the right human resource strategy for the business. It will begin with a consideration of how to link the people strategy to the business strategy, move through a discussion of segmenting and analyzing the workforce, and then cover the contribution of human resource functions in creating the right environment to motivate the highest levels of performance. This course is designed for

students with full-time work experience. Students without pre-MBA work experience should take the course in year two after completion of a summer internship.

MGT 538, Integrated Value Creation: The Wholomics Approach (1.5)

The purpose of this course is to develop an integrated model of shareholder value creation in organizations that relies on concepts students have learned in various functional areas, and to show how tangible (six-sigma quality initiatives, EVA, mergers, etc.), as well as seemingly intangible (leadership development, creativity, knowledge, innovation, etc.), forms of value creation affect firms' market values. This model exposes both the complementarities and the tensions in the four basic ways in which value is created in organizations, and sheds lights on how "metric-driven" conflicts arise in organizations to impede effective value creation for shareholders. We will discuss the "rules" of value creation in the four quadrants of the Wholomics model and examine the optimal design of performance metrics in these quadrants. We will examine best practices for different forms of value creation and analyze organizational situations from the perspective of a value-creation consultant. The goal is to develop an improved understanding of how "soft" and "hard" value creation initiatives interact and how one should design, manage and lead an organization.

OB 500E, Talent Analytics (1.5)

Finding, developing, and retaining the best talent has always been the key to sustained success in business. Organizations today have potential access to far more useful information about people than ever before but most struggle to access and use it effectively. In a highly competitive global market, rigorously analyzing data to enable timely, strategic decisions about talent provides a critical edge. In this course you will learn how to use analytics to bring data and rigorous modelling to bear on people-related issues, such as recruiting, performance evaluation, leadership development and succession, job design, and compensation. Together, these can help organizations achieve long range strategic goals, rather than simply serving as an administrative support function.

OB 565, Leading Change 1.5)

This course introduces the concepts of how leaders create and manage change. It focuses initially on the role of leaders in articulating a new organizational operating model for their constituents. The course focuses on leader perspectives, behaviors, and skills required to implement organizational change including the leader's role in articulating the organization's operating model, the roles of those involved in strategic change; how to effectively challenge current processes, building support regarding a new vision; and enabling others to act. The class approach will include presentations on leadership experiences, case studies of examples of leaders exhibiting specific behaviors, and experiential exercises. Students cannot take this course and OB 525B for credit. NOTE: This course will have a lab fee.

OB 535, People Metrics (1.5)

Metrics are at the core of people analytics. The purpose of this course is to introduce you to the foundations of assessing behavior in organizations using novel measurement approaches and large datasets. Through classroom discussions and real-world applications, this course will enable you to add value to organizations through the development, use, and interpretation of innovative people metrics. Specifically, after taking this course, you will be able to: Develop a clear and logical conceptual measurement model. A conceptual measurement model is the foundation of creating novel and useful new approaches for assessing intrapersonal characteristics (e.g., personality) and interpersonal behavior (e.g., knowledge sharing, teamwork). Identify novel sources of data for innovative people metrics. Organizations are awash in the traces of individual behavior and social interactions. Decoding how data that already exist in an organization can be used to understand behavior is an essential skill for adding value in the field of people analytics. Apply a rigorous process for validating new people metrics. Developing a measurement model and finding sources of

data are necessary, but insufficient for adding value through people metrics. New measures must be validated.

MGT 538B Compensation, Incentives, and Organization (1.5)

HRM XXX, Practicum in Talent Analytics (3)

MGT 502, Ethical Issues in Managerial Decision Making

This course consists of a seminar which focuses on ethical issues in management. This course is "team taught" and surveys a number of ethical standards or levels by which managers make decisions involving most functional areas of business. Course will emphasize discussion by students of cases and problem situations which confront managers and for which ethical dimensions are a significant part of the business choices. Course grade is determined by class participation and a written summary paper. See instructor for additional information.

MGT 500R, Developing Human Resource Strategy (1.5)