

# DATA SCIENCE AND BUSINESS ANALYTICS (M.S. WITH A CONCENTRATION IN DATA-DRIVEN BUSINESS)

Analytics is a fast-growing STEM field with a high demand for individuals who possess the skills and expertise necessary to navigate the process of transforming data into insight for making sound business decisions. It's the reason that the WSU College of Engineering and the Mike Ilitch School of Business launched an innovative and interdisciplinary new master's program in data science and business analytics. Leaders in this field use data to fundamentally rethink all facets of business in many sectors, including manufacturing, supply chain, finance, and healthcare.

## Admission

Admission to any graduate program is contingent upon admission to the Graduate School (<http://bulletins.wayne.edu/graduate/general-information/admission/>). Applicants should have 3.0 or higher cumulative undergraduate g.p.a.

## Interview

Prospective candidates being considered for admission may have to participate in an online interview with the admissions committee. Upon evaluating the application, admissible candidates will be contacted for scheduling these interviews.

## Prerequisite Knowledge

Candidates are expected to well-versed in basic probability and statistics and also familiar with some programming language. Courses will be available in the summer months for admitted applicants to refresh their knowledge or makeup for any deficiency in this knowledge.

Students without this prerequisite knowledge but otherwise possess good credentials will be given conditional admission and have to take this remedial coursework in the summer months prior to starting the program in the fall term

## Graduate Management Admission Test (GMAT) and Graduate Record Examination (GRE)

Applicants must complete the GRE or the GMAT with minimum scores in the top 75 percentile.

Students must complete a total of 30 credits in order to earn the M.S. in Data Science and Business Analytics.

The "interdisciplinary core" includes 9 credits of coursework across business, computer science, and industrial engineering. On top of this integrated breadth of study covering the core areas of data science and business analytics, each student has 9 credits of "concentration" courses to give them depth in an engineering, business, or analytics area. Each student's 6 credits of elective choices can be personalized to support their individual career goals. The final piece of the curriculum is a 6-credit applied analytics practicum, in which students will work with companies and organizations on real analytics problems.

## Curriculum for the Data-Driven Business Concentration

Code	Title	Credits
<b>Module 1: Core Courses</b>		<b>9</b>
DSB 6000	Data Science Strategy & Leadership	
DSA 6000	Data Science and Analytics	
DSE 6000	Computing Platforms for Data Science	
<b>Module 2: Concentration Courses</b>		<b>9</b>
DSB 6100	Marketing Analytics	
DSB 6200	Manufacturing & Supply Chain Analytics	
DSB 6300	Social and Collaboration Networks	
<b>Module 3: Electives*</b>		<b>6</b>
<b>Module 4: Applied Analytics Practicum</b>		<b>6</b>
DSB 7500	Practicum	
<b>Total Credits</b>		<b>30</b>

\* Elective courses (<https://engineering.wayne.edu/data-analytics/curriculum/electives.php>) can come from other tracks of the Data Science & Business Analytics program or from outside the program.

## Data Science and Analytics

### DSA 6000 Data Science and Analytics Cr. 3

Basic data science and analytics concepts covered through case studies, success stories, and a semester project that cuts across all course modules. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics.

### DSA 6100 Statistical Methods for Data Science & Analytics Cr. 3

Statistical methods and techniques required for data science and analytics applications covered through case studies, success stories, and a semester project that cuts across all course modules. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics.

**Course Material Fees:** \$50

### DSA 6200 Operations Research Cr. 3

Mathematical optimization models that come into play in data science and analytics applications covered through case studies and a semester project. Heuristic solution approaches will also be addressed along with sensitivity analysis techniques. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics.

### DSA 6300 Decision Analysis and Simulation Cr. 3

Coherent approach to decision making, developing rules of thought to transform complex decisions into simpler decision situations covered through case studies, success stories, and a semester project that cuts across all course modules. Discusses role of discrete-event simulation for improving decision support. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics.

### DSA 7500 Practicum Cr. 6

Apply theoretical knowledge acquired throughout the Big Data & Business Analytics MS program to a challenging project involving real-world business problems/opportunities and data analytics in a reliable, scalable, distributed computing environment. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics; enrollment is limited to Graduate level students.

**Course Material Fees:** \$50

**Equivalent:** DSB 7500, DSE 7500

## Data Science for Business

### **DSB 6000 Data Science Strategy & Leadership Cr. 3**

Provides an understanding of how organizations can leverage data science and analytics to gain competitive advantage and how to use the data to align with a company's mission and goals. Students will learn how organizations derive business value/impact, and return on investment, and the importance of interpreting and communicating the business case. Offered Yearly.

### **DSB 6100 Marketing Analytics Cr. 3**

Application and synthesis of marketing methods and modeling approaches to design, analyze, and optimize digital marketing campaigns and to understand customer segments, customer life cycles, and lifetime values. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics.

### **DSB 6200 Manufacturing & Supply Chain Analytics Cr. 3**

Discussion of the strategic and tactical issues surrounding the design and operation of supply chains through effective information collection, sharing, and collaboration, an understanding of applied analytical tools and methods that can be used to make better supply chain decisions and practical application of supply chain advanced planning and optimization solutions. Offered Yearly.

### **DSB 6300 Social and Collaboration Networks Cr. 3**

Leveraging data science tools & technologies for network analysis with practical applications to support and provide a structure for fact-based decision making for individuals working to gain insight into complex organizational problems. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics.

### **DSB 7500 Practicum Cr. 6**

Apply theoretical knowledge acquired throughout the Big Data & Business Analytics MS program to a challenging project involving real-world business problems/opportunities and data analytics in a reliable, scalable, distributed computing environment. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics; enrollment is limited to Graduate level students.

**Equivalent:** DSA 7500, DSE 7500

## Data Science for Engineering

### **DSE 5070 Introduction to Data Computing and Programming Cr. 3**

Not for CSC major credit. Background in calculus and linear algebra is necessary. This course introduces students to the foundation of data computing problem solving using programming languages of Python and R. It provides students with skills that will enable them to make productive use of "data science" techniques to model and interpret data. The course covers the following topics: 1) Basic concepts of probability and statistics; 2) Python and R basics; 3) Data pre-processing, modeling, and visualizing with Python/R. Offered Yearly.

### **DSE 6000 Computing Platforms for Data Science Cr. 3**

Covers an overview of various computing platforms for developing, deploying, configuring a wide range of data science applications for different domains. The programming models, characteristics of supported workload, and management of performance, cost and scalability will be compared side by side. Offered Yearly.

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### **DSE 6100 Data Modeling and Management Cr. 3**

Covers both traditional data modeling and big data modeling from conceptual design, logical-to-physical mapping, to physical schema optimization. Provenance management, which concerns about the lineage and history of a data product, is important for the repeatability of data analysis. The course will present various concepts of provenance and its relationships to data quality and trust. Offered Yearly.

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### **DSE 6200 Modern Databases Cr. 3**

Covers an overview of databases, tools, and computing platforms. One focus is basic SQL, NoSQL, and NewSQL programming skills and a comparison of their cons and pros. In particular, the students will learn the criteria to choose a database system, either SQL or NoSQL, based on the requirements of an application domain. Offered Yearly.

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### **DSE 6300 Data Science Applications Development Cr. 3**

Focuses on the software engineering cycle of developing a comprehensive data science application. Students will have the freedom to choose a computing platform, or a NoSQL database as the underlying infrastructure for developing a data science application. Students will also choose a particular domain and problem in which one needs to address one of the big data challenges: volume, velocity, or variety. Offered Yearly.

### **DSE 7500 Practicum Cr. 6**

Apply theoretical knowledge acquired throughout the Big Data & Business Analytics MS program to a challenging project involving real-world business problems/opportunities and data analytics in a reliable, scalable, distributed computing environment. Offered Yearly.

**Restriction(s):** Enrollment is limited to students with a major in Data Sci & Business Analytics; enrollment is limited to Graduate level students.

**Equivalent:** DSA 7500, DSB 7500