

DATA SCIENCE AND BUSINESS ANALYTICS (M.S.)

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.

Base Curriculum for all Concentrations

Code	Title	Credits
	Data Science Analytics	3
	Data Science Strategy and Leadership	3
	Computing Platforms for Data Science	3
	Three Concentration Courses	9
	Two Elective Courses	6

Data Science and Business Analytics Practicum	6
Total Credits	30

Each student's course choices must satisfy the requirements of at least one of the defined concentrations: Data Science and Engineering, Data Science and Analytics, or Business

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.

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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.

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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.

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DSA 7500 Practicum Cr. 6

Application of theoretical knowledge acquired during the Data Science and Business Analytics program to a project involving actual business problems/opportunities and data in a realistic setting. Engages the entire process of solving a real-world data science and business analytics project including: setting the project scope, collecting and processing data, applying analytic methods and presenting the developed solution platform. Both the problem statements for the project assignments and the datasets originate from real-world domains. Offered Yearly.

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

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.

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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.

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DSB 7500 Practicum Cr. 6

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Equivalent: DSA 7500, DSE 7500

Data Science for Engineering

DSE 5070 Introduction to Data Computing and Programming Cr. 3

Not for CSC major credit. Offered for graduate credit only. 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.

Restriction(s): Enrollment is limited to Graduate level students.

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.

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

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.

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

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

Application of theoretical knowledge acquired during the Data Science and Business Analytics program to a project involving actual business problems/opportunities and data in a realistic setting. Engages the entire process of solving a real-world data science and business analytics project including: setting the project scope, collecting and processing data, applying analytic methods and presenting the developed solution platform. Both the problem statements for the project assignments and the datasets originate from real-world domains. Offered Yearly.

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