



Program Guidebook

Master of Science, Data Analytics - Data Engineering

The MS Data Analytics degree prepares a diverse range of professionals for thriving careers in the dynamic field of data analytics. By arming graduates with the competencies needed to tackle business challenges through data mining, predictive analysis, analytics deployment, and compelling data storytelling techniques, the MSDA ensures they are well-prepared for success. Emphasizing both theory and practical application, the curriculum fosters the development of skills necessary to drive impactful change within organizations spanning various industries and sectors. The Data Engineering concentration builds upon core techniques in data management and governance to further bolster analytics initiatives, delving into cloud-native databases, data processing, and approaches to support scale. The program includes a concentration-specific capstone, providing an opportunity for students to showcase their skills in a comprehensive manner.

Understanding the Competency-Based Approach

Practically speaking, how do competency-based programs like those offered at Western Governors University (WGU) work? Unlike traditional universities, WGU does not award degrees based on completion of a certain number of credit hours or a certain set of required courses. Instead, you will earn your degree by demonstrating your skills, knowledge, and understanding of important concepts.

Progress through a degree program is governed not by the amount of time you spend in class but by your ability to demonstrate mastery of competencies as you complete required courses. Of course, you will need to engage in learning experiences as you review competencies or develop knowledge and skills in areas in which you may be weak. To help you acquire the knowledge and skills you need to complete your courses and program, WGU provides a rich array of learning resources. Your program mentor will work closely with you to help you understand the competencies required for your program and to help you create a schedule for completing your courses. You will also work closely with course instructors as you engage in each of your courses. As subject matter experts, course instructors will guide you through the content you must master to pass the course assessments.

The benefit of this competency-based system is that it enables students who are knowledgeable about a particular subject to make accelerated progress toward completing a degree, even if they lack college experience. You may have gained skills and knowledge of a subject while on the job, accumulated wisdom through years of life experience, or already taken a course on a particular subject. WGU will award your degree based on the skills and knowledge that you possess and can demonstrate—not the number of credits hours on your transcript.

Accreditation

Western Governors University is the only university in the history of American higher education to have earned accreditation from four regional accrediting commissions. WGU's accreditation was awarded by (1) the Northwest Commission on Colleges and Universities, (2) the Higher Learning Commission of the North Central Association of Colleges and Schools, (3) the Accrediting Commission for Community and Junior Colleges of the Western Association of Schools and Colleges, and (4) the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges. The university's accreditation status is now managed by the Northwest Commission on Colleges and Universities (NWCCU), which reaffirmed WGU's accreditation in February 2020. The WGU Teachers College is accredited at the initial-licensure level by the Council for the Accreditation of Educator Preparation (CAEP) and by the Association for Advancing Quality in Educator Preparation (AAQEP). The nursing programs are accredited by the Commission on Collegiate Nursing Education (CCNE). The Health Information Management program is accredited by the Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM). The College of Business programs are accredited by the Accreditation Council for Business Schools and Programs (ACBSP).

The Degree Plan

The focus of your program is your personalized Degree Plan. The Degree Plan is a detailed blueprint of the courses you will need to complete in order to earn your degree. The Degree Plan also lays out the accompanying learning resources and assessments that compose your program. The list of courses in the Degree Plan is often referred to as the standard path. The amount of time it takes to complete your program depends on both the amount of new information you need to learn and the amount of time you plan to devote each week to study. Your program mentor and course instructors will help you assess your strengths and development needs to establish a study plan.

Students vary widely in the specific skills and information they need to learn. For example, some students may be highly knowledgeable in a particular subject matter and would not need to engage in new learning opportunities. Other students may find that portions of the program require them to learn new information and that they need to take an online class or participate in a study module to acquire the knowledge and skills needed to fulfill program competencies in that area. Some individuals may be able to devote as little

as 15–20 hours per week to the program, while others may need to devote more time. For this reason, pre-assessments are there to help your program mentor form a profile of your prior knowledge and create a personalized Degree Plan.

How You Will Interact with Faculty

At WGU, faculty serve in specialized roles, and they will work with you individually to provide the guidance, instruction, and support you will need to succeed and graduate. As a student, it is important for you to take advantage of this support. It is key to your progress and ultimate success.

Upon your enrollment, you will be assigned a program mentor—an expert in your field of study who will provide you with regular program-level guidance and support from the day you start until the day you graduate. Your program mentor will set up regular telephone appointments (weekly at first) with you, which you will be expected to keep. The mentor will review program competencies with you and work with you to develop a plan and schedule for your coursework. Your program mentor will serve as your main point of contact throughout your program—helping you set weekly study goals, recommending specific learning materials, telling you what to expect in courses, and keeping you motivated. In addition to regular calls, your program mentor is available to help you resolve questions and concerns as they arise.

You will also be assigned to a course instructor for each course. Course instructors are subject matter experts who will assist your learning in each individual course. When you begin a new course, your assigned course instructor will actively monitor your progress and will be in touch to offer one-on-one instruction and to provide you with information about webinars, cohort sessions, and other learning opportunities available to help you acquire the competencies you need to master the course. Your course instructor can discuss your learning for the course, help you find answers to content questions, and give you the tools to navigate the course successfully. In addition, you will communicate with course instructors by posting in the online learning community and participating in live discussion sessions such as webinars and cohorts.

For many of the courses at WGU, you will be required to complete performance assessments. These include reports, papers, presentations, and projects that let you demonstrate your mastery of the required competencies. A separate group of faculty members, called evaluators, will review your work to determine whether it meets requirements. Evaluators are also subject matter experts in their field of evaluation. If your assessment needs further work before it “meets competency,” these evaluators, who review your work anonymously, will provide you with evaluation feedback to help you demonstrate competency and allow you to advance.

Connecting with Other Mentors and Fellow Students

As you proceed through your Degree Plan, you will have direct contact with multiple faculty members. These communications can take a variety of forms, including participation in one-on-one discussions, chats in the learning communities, and live cohort and webinar opportunities. As a WGU student, you will have access to your own personal MyWGU Student Portal, which will provide a gateway to your courses of study, learning resources, and learning communities where you will interact with faculty and other students.

The learning resources in each course are specifically designed to support you as you develop competencies in preparation for your assessments. These learning resources may include reading materials, videos, tutorials, cohort opportunities, community discussions, and live discussions that are guided by course instructors who are experts in their field. You will access your program community during your orientation course to network with peers who are enrolled in your program and to receive continued support through professional enrichment and program-specific chats, blogs, and discussions. WGU also provides Student Services associates to help you and your program mentor solve any special problems that may arise.

Orientation

The WGU orientation course focuses on acquainting you with WGU's competency-based model, distance education, technology, and other resources and tools available for students. You will also utilize WGU program and course communities, participate in activities, and get to know other students at WGU. The orientation course must be completed before you can start your first term at WGU.

Transferability of Prior College Coursework

Because WGU is a competency-based institution, it does not award degrees based on credits but rather on demonstration of competency. However, if you have completed college coursework at another accredited institution, or if you have completed industry certifications, you may have your transcripts and certifications evaluated to determine if you are eligible to receive some transfer credit. The guidelines for determining what credits will be granted varies based on the degree program. Students entering graduate programs must have their undergraduate degree verified before being admitted to WGU. To review more information in regards to transfer guidelines based on the different degree programs, you may visit the Student Handbook found at the link below and search for "Transfer Credit Evaluation."

[Click here for the Student Handbook](#)

WGU does not waive any requirements based on a student's professional experience and does not perform a "résumé review" or "portfolio review" that will automatically waive any degree requirements. Degree requirements and transferability rules are subject to change in order to keep the degree content relevant and current.

Remember, WGU's competency-based approach lets you take advantage of your knowledge and skills, regardless of how you obtained them. Even when you do not directly receive credit, the knowledge you possess may help you accelerate the time it takes to complete your degree program.

Continuous Enrollment, On Time Progress, and Satisfactory Academic Progress

WGU is a "continuous enrollment" institution, which means you will be automatically enrolled in each of your new terms while you are at WGU. Each term is six months long. Longer terms and continuous enrollment allow you to focus on your studies without the hassle of unnatural breaks between terms that you would experience at a more traditional university. At the end of every six-month term, you and your program mentor will review the progress you have made and revise your Degree Plan for your next six-month term.

WGU requires that students make measurable progress toward the completion of their degree programs every term. We call this "On-Time Progress," denoting that you are on track and making progress toward on-time graduation. As full-time students, graduate students must enroll in at least 8 competency units each term, and undergraduate students must enroll in at least 12 competency units each term. Completing at least these minimum enrollments is essential to On-Time Progress and serves as a baseline from which you may accelerate your program. We measure your progress based on the courses you are able to pass, not on your accumulation of credit hours or course grades. Every time you pass a course, you are demonstrating that you have mastered skills and knowledge in your degree program. For comparison to traditional grading systems, passing a course means you have demonstrated competency equivalent to a "B" grade or better.

WGU assigns competency units to each course in order to track your progress through the program. A competency unit is equivalent to one semester credit of learning. Some courses may be assigned 3 competency units while others may be as large as 12 competency units.

Satisfactory Academic Progress (SAP) is particularly important to students on financial aid because you must achieve SAP in order to maintain eligibility for financial aid. We will measure your SAP quantitatively by reviewing the number of competency units you have completed each term. In order to remain in good

academic standing, you must complete at least 66.67% of the units you attempt over the length of your program—including any courses you add to your term to accelerate your progress. Additionally, during your first term at WGU you must pass at least 3 competency units in order to remain eligible for financial aid. We know that SAP is complex, so please contact a financial aid counselor should you have additional questions. *Please note: The Endorsement Preparation Program in Educational Leadership is not eligible for federal financial aid.

Courses

Your Degree Plan includes courses needed to complete your program. To obtain your degree, you will be required to demonstrate your skills and knowledge by completing the assessment(s) for each course. In general there are two types of assessments: performance assessments and objective assessments. Performance assessments contain, in most cases, multiple scored tasks such as projects, essays, and research papers. Objective assessments include multiple-choice items, multiple-selection items, matching, short answer, drag-and-drop, and point-and-click item types, as well as case study and video-based items. Certifications verified through third parties may also be included in your program. More detailed information about each assessment is provided in each course of study.

Learning Resources

WGU works with many different educational partners, including enterprises, publishers, training companies, and higher educational institutions, to provide high-quality and effective learning resources that match the competencies you are developing. These vary in type, and may be combined to create the best learning experience for your course. A learning resource can be an e-textbook, online module, study guide, simulation, virtual lab, tutorial, or a combination of these. The cost of most learning resources are included in your tuition and Learning Resource Fee. They can be accessed or enrolled for through your courses. Some degree-specific resources are not covered by your tuition, and you will need to cover those costs separately. WGU also provides a robust library to help you obtain additional learning resources, as needed.

Mobile Compatibility:

The following article provides additional details about the current state of mobile compatibility for learning resources at WGU.

[Student Handbook article: Can I use my mobile device for learning resources?](#)

Standard Path

As previously mentioned, competency units (CUs) have been assigned to each course in order to measure your academic progress. If you are an undergraduate student, you will be expected to enroll in a minimum of 12 competency units each term. Graduate students are expected to enroll in a minimum of 8 competency units each term. A standard plan for a student for this program who entered WGU without any transfer units would look similar to the one on the following page. Your personal progress can be faster, but your pace will be determined by the extent of your transfer units, your time commitment, and your determination to proceed at a faster rate.

Standard Path for Master of Science, Data Analytics - Data Engineering

Course Description	CUs	Term
The Data Analytics Journey	2	1
Data Management	3	1
Analytics Programming	3	1
Data Preparation and Exploration	3	2
Statistical Data Mining	3	2
Data Storytelling for Diverse Audiences	3	2
Deployment	3	3
Cloud Databases	3	3
Data Processing	3	3
Data Analytics at Scale	3	4
Data Engineering Capstone	3	4

Changes to Curriculum

WGU publishes an Institutional Catalog, which describes the academic requirements of each degree program. Although students are required to complete the program version current at the time of their enrollment, WGU may modify requirements and course offerings within that version of the program to maintain the currency and relevance of WGU's competencies and programs. When program requirements are updated, students readmitting after withdrawal from the university will be expected to re-enter into the most current catalog version of the program.

Areas of Study for Master of Science, Data Analytics - Data Engineering

The following section includes the areas of study in the program, with their associated courses. Your specific learning resources and level of instructional support will vary based on the individual competencies you bring to the program and your confidence in developing the knowledge, skills, and abilities required in each area of the degree. The Degree Plan and learning resources are dynamic, so you need to review your Degree Plan and seek the advice of your mentor regarding the resources before you purchase them.

Data Analytics

The Data Analytics Journey

Analytics is the creative use of data and statistical modeling to tell a compelling story that not only drives strategic action but also results in business value. The Data Analytics Journey uses the analytics life cycle to conceptualize the processes, tools, and techniques for implementing data analysis, data engineering, and analytics product management. Learners gain fluency in gathering requirements, asking business questions, establishing evaluation metrics, identifying communication models, and aligning the analytics project outcomes to business goals. It presents an overview of the various tracks offered in the program and the career options in these specializations.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner applies the data analytics life cycle to real world business scenarios.*
- *The learner proposes a data analytics plan to solve a business problem.*
- *The learner differentiates the variety of careers and roles related to the broad field of data analytics.*
- *The learner identifies potential career goals based on foundational knowledge of self and career pathways.*

Data Management

Data Management builds proficiency in using both relational and non-relational databases. Topics include selection of a data storage architecture, data types, data structures, normalization and denormalization, and querying databases. Structured Query Language (SQL) topics including Data Definition Language (DDL) and Data Manipulation Language (DML) are covered, including joins, aggregations, and transactions. Non-relational approaches to organizing and querying data are contrasted with relational approaches to build competency in adapting data storage architectures to business needs.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner recommends an appropriate data architecture.*
- *The learner examines the data available for analysis to determine their dimension, quality, relations, and limitations.*
- *The learner constructs a logical data model.*
- *The learner implements physical data models by incorporating required data.*
- *The learner performs database queries to answer a business question.*
- *The learner uses appropriate data manipulation language.*

Analytics Programming

Analytics Programming builds algorithmic thinking using both the Python and R programming languages. This course builds from the foundations of programming. Learners use libraries and packages to perform common analytics tasks, including acquiring, organizing, and manipulating datasets. The course also presents methods for applying statistical functions and graphical user interfaces to perform basic analysis and to present findings.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*

- *The learner documents the required component parts of a complex programming task.*
- *The learner integrates programming language syntax, control elements, and modular components from common data analytics programming languages to create simple programs.*
- *The learner performs data acquisition and organization tasks using a data analytics programming language.*

Data Preparation and Exploration

Data Preparation and Exploration applies analytical programming skills to the early steps of the data analytics life cycle. This course covers cleaning data to ensure the structure, accuracy, and quality of the data; interpretation of descriptive and inferential statistics as well as visualizations of data; and wrangling data to prepare it for further analysis. The course introduces hypothesis testing, focusing on application for parametric tests, and addresses communication skills and tools to explain an analyst's findings to others within an organization. The following courses are prerequisites: The Data Analytics Journey, Data Management, and Analytics Programming.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner interprets a data dictionary to understand the data set.*
- *The learner interprets probability, descriptive and inferential statistics, and visualization.*
- *The learner wrangles data to ensure accuracy, format, and integrity relevant to the task being performed.*

Statistical Data Mining

Statistical Data Mining focuses on concepts in data preparation and supervised and unsupervised machine learning techniques. The course helps students gain basic knowledge in statistics, data preparation, regression, and dimensional reduction. Learners implement supervised models—specifically classification and prediction data mining models—to unearth relationships among variables that are not apparent with more surface-level techniques. The course also explains when, how, and why to use unsupervised models to best meet organizational needs. The following course is prerequisite: Data Preparation and Exploration.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner performs linear and logistic regressions to make recommendations based on the results.*
- *The learner performs principal component analysis to make recommendations based on the results.*

Data Storytelling for Diverse Audiences

Data Storytelling for Diverse Audiences focuses on communicating observations and patterns to diverse stakeholders, a key aspect of the data analytics life cycle. This course helps learners gain communication and storytelling skills in order to motivate change and answer business problems. It also covers data visualizations, audio representations, interactive dashboards, interpersonal communication, and presentation skills.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner demonstrates how interpersonal skills are applied to effectively communicate.*
- *The learner conducts an audience analysis.*
- *The learner communicates data insights to technical and nontechnical audiences.*
- *The learner creates data representations to offer insight into an organizational problem.*
- *The learner designs interactive dashboards to support executive decision-making.*

Deployment

Deployment is the practice of operationalizing data analysis within a business environment. Given an analysis, learners determine the business functional and non-functional requirements for wider use and implement pipelines and functions to deploy analyses at scale. Topics including security, scalability, usability, and availability are discussed. Prerequisites for

this course are Analytical Programming, Data Management, Data Preparation, and Statistical Data Mining.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner analyzes a business case to determine the requirements necessary for deployment.*
- *The learner implements a data product pipeline to address organizational needs.*
- *The learner implements a function to call and receive information between multiple systems for deployment.*
- *The learner deploys a data product based on project requirements.*

Data Engineering

Cloud Databases

Cloud Databases covers the application of cloud architectures to large-scale data systems. The differences between cloud-native approaches to data architectures and smaller scale systems are discussed and learners apply cloud computing concepts to address specific business scenarios.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner explains the advantages of using a cloud data solution.*
- *The learner recommends a cloud data storage structure to address organizational requirements.*
- *The learner implements a cloud data storage structure to address organizational requirements.*

Data Processing

Data Processing is the practice of automating data flow into and out of components of an analytics system and comprises a major part of the analytics life cycle in modern organizations. Data Processing covers concepts in Extract, Transform, and Load (ETL) pipeline operations on data at scale and variations of ETL (Extract, Transform, and Load) as a function of data repositories including data warehouses and data lakes. Streaming and batch data operations and their differences are discussed, and learners implement pipeline solutions in cloud-native environments.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner recommends a data processing solution that includes a data flow diagram and a process flow diagram.*
- *The learner implements a process that extracts, transforms, and loads data for use.*
- *The learner creates a plan for continuous monitoring of data processing pipelines.*

Data Analytics at Scale

Data Analytics at Scale builds on previous data engineering courses and discusses approaches for analyzing large data sets. The course discusses map/reduce approaches, Apache Spark, and cloud-native solutions for developing, automating, and scaling data analytics. Also discussed are methods for integrating data processing pipelines and data stores to create comprehensive data analytics architectures.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner explains the advantage of using a big data analytics solution.*
- *The learner proposes a large-scale data analytics solution to meet a business need.*
- *The learner implements a big data architecture to demonstrate the solution to the business problem.*

Data Engineering Capstone

The Data Engineering Capstone has learners utilize the skills learned throughout the MDSA core courses and the data

engineering courses to examine a problem where data engineering is a solution and to build a cloud-native infrastructure that allows for data processing. Learners are asked to implement their solutions and tell a story using the data. Course material introduces the project and reminds learners of relevant learning resources from previous courses that will prove helpful in completing the performance assessment.

This course covers the following competencies:

- *The learner proposes a data analytics approach to solve a business problem.*
- *The learner implements a data analytics approach to address a business problem.*
- *The learner communicates information and data trends using data storytelling and visualization.*

Accessibility and Accommodations

Western Governors University is committed to providing equal access to its academic programs to all qualified students. WGU's Accessibility Services team supports this mission by providing support, resources, advocacy, collaboration, and academic accommodations for students with disabilities and other qualifying conditions under the Americans with Disabilities Act (ADA). WGU encourages student to complete the Accommodation Request Form as soon as they become aware of the need for an accommodation. Current and prospective students can reach the Accessibility Services team Monday through Friday 8:00 a.m. to 5:00 p.m. MST at 1-877-HELP-WGU (877-435-7948) x5922 or at ADASupport@wgu.edu.

Need More Information? WGU Student Services

WGU's Student Services team is dedicated exclusively to helping you achieve your academic goals. The Student Services office is available during extended hours to assist with general questions and requests. The Student Services team members help you resolve issues, listen to student issues and concerns, and make recommendations for improving policy and practice based on student feedback.

Student Services team members also assist with unresolved concerns to find equitable resolutions. To contact the Student Services team, please feel free to call 877-435-7948 or e-mail studentservices@wgu.edu. We are available Monday through Friday from 6:00 a.m. to 10:00 p.m., Saturday from 7:00 a.m. to 7:00 p.m., mountain standard time. Closed Sundays.

If you have inquiries or concerns that require technical support, please contact the WGU IT Service Desk. The IT Service Desk is available Monday through Friday, 6:00 a.m. to 10:00 p.m. and Saturday and Sunday, 10:00 a.m. to 7:00 p.m., mountain standard time. To contact the IT Service Desk, please call 1-877-HELP-WGU (877-435-7948) or e-mail servicedesk@wgu.edu. The support teams are generally closed in observance of university holidays.

For the most current information regarding WGU support services, please visit "Student Support" on the Student Portal at <http://my.wgu.edu>.