



Program Guidebook

Bachelor of Science, Data Management/Data Analytics

The B.S. in Data Management/Data Analytics is designed to prepare database professionals who can set up a database environment, design databases, acquire data, wrangle it, analyze it, and visualize it to different audiences as part of the decision-making process

Understanding the Competency-Based Approach

Practically speaking, what does it mean when we say that WGU's programs are competency-based? Unlike traditional universities, WGU does not award degrees based on credit hours or on a certain set of required courses. Instead, you will earn your degree by demonstrating your skills, knowledge, and understanding of important concepts through a series of carefully designed courses.

Progress through your degree program is governed not by classes but by satisfactory completion of the required courses that demonstrate your mastery of the competencies. Of course, you will need to engage in learning experiences as you brush up on competencies or develop knowledge and skills in areas in which you may be weak. For this learning and development, WGU has a rich array of learning resources in which you may engage under the direction of your student mentor. You will work closely with your mentor to schedule your program for completing the courses. You will also work closely with additional faculty members as you proceed through courses of study that are designed to lead you through the content you must master in order to pass the assessment(s) for each course.

The benefit of this competency-based system is that it makes it possible for people who are knowledgeable about a particular subject to make accelerated progress toward completing a WGU 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, indeed, 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). The WGU Teachers College is accredited by the National Council for Accreditation of Teacher Education (NCATE). The nursing programs are accredited by the Commission on Collegiate Nursing Education (CCNE). The Health Informatics program is accredited by the Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM).

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.

Students will 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 may need to take an online class or participate in a study module to acquire the knowledge and skills needed to pass the 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, you will complete preassessments to help your mentor form a profile of your prior knowledge and experience for use in creating your personalized Degree Plan.

WGU's Mentoring Approach

The mentoring approach is a powerful component of the WGU educational experience. When you enroll at WGU, you will begin interacting with your student mentor, course mentors, and other support staff. Your student mentor will meet with you on a regular basis and take an active role and a personal interest in your success. Your student mentor will be your point of contact throughout your program and will be available to communicate with you via e-mail or phone. Your mentor will help you set weekly study goals, guide you to learning materials, help you understand what to expect in courses, and motivate you to work hard to complete your program. When you have questions or concerns, your mentor will help you resolve them.

As you work on each course, you will also be assigned course mentors. These course mentors are content experts who can discuss your learning for the course, help you find answers to content questions, and help you navigate the course successfully. Your course mentors are available to meet with you individually to provide personal support. You can also communicate with them by posting in the online learning community and participating in live discussion sessions such as webinars and cohorts.

Working closely with your own personal mentoring team will help you engage in the learning process and be a successful student while at WGU.

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 have interactions with faculty and other students.

The resources in each course are specifically designed to support you as you develop competencies in preparation for your assessments through the utilization of reading materials, videos, tutorials, cohort opportunities, community discussions, and live discussions that are guided by content experts. 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 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 student 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 eight (8) competency units each term, and undergraduate students must enroll in at least twelve (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.

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

You will work with your mentor to select the various learning resources needed to prepare for the assessments in each course. In most cases, the learning materials you will use are independent learning resources such as textbooks, e-learning modules, study guides, simulations, virtual labs, and tutorials. WGU works with dozens of educational providers, including enterprises, publishers, training companies, and higher educational institutions to give you high-quality and effective instruction that matches the competencies that you are developing. The cost of most learning resources is included in your tuition, and you can enroll directly in those through your Degree Plan as your mentor has scheduled them. Some resources are not covered by your tuition, and you will need to cover those costs separately. WGU has excellent bookstore and library arrangements to help you obtain the needed 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* Bachelor of Science, Data Management/Data Analytics

Course Description	CUs	Term
Introduction to IT	4	1
Critical Thinking and Logic	3	1
Introduction to Communication	3	1
English Composition I	3	1
English Composition II	3	2
IT Foundations	4	2
IT Applications	4	2
College Algebra	4	2
Introduction to Humanities	3	3
Network and Security - Foundations	3	3
Introduction to Geography	3	3
Web Development Foundations	3	3
Networks	4	4
Scripting and Programming - Foundations	3	4
Introduction to Physics	4	4
Introduction to Probability and Statistics	3	4
Scripting and Programming - Applications	4	5
Data Structures	4	5
Technical Communication	3	5
Spreadsheets	3	5
Business of IT - Project Management	4	6
Data Management - Foundations	3	6
Data Management - Applications	4	6
Business of IT - Applications	4	6
Structured Query Language	4	7
Network and Security - Applications	4	7
Database Server Administration	6	7
Introduction to Data Science	4	8
Data Wrangling with MongoDB	3	8
Data Analysis with R	2	8
Machine Learning	3	8

Course Description	CUs	Term
Data Visualization	3	9
Data Analytics	4	9
IT Capstone Written Project	4	9

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. As these changes are implemented, WGU will ensure that the length of the student's degree program (i.e., total competency unit requirements) will not increase and that competency units already earned will be applied to the updated program version. When program requirements are updated, students returning from term break or returning after withdrawal from the university will be expected to re-enter the updated version of the program.

Areas of Study for Bachelor of Science, Data Management/Data Analytics

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.

IT Fundamentals

Introduction to IT

This course introduces students to information technology as a discipline and the various roles and functions of the IT department as business support. Students are presented with various IT disciplines including systems and services, network and security, scripting and programming, data management, and business of IT, with a survey of technologies in every area and how they relate to each other and to the business.

This course covers the following competencies:

- *The graduate describes the structure, function, and security associated with networks.*
- *The graduate explains the structure and function of databases.*
- *The graduate describes IT as a discipline and discusses the history and future of computing as well as the currently used infrastructure.*
- *The graduate explains the role of technology in today's business environment and describes basic concepts of project management.*
- *The graduate identifies common software architectures, development techniques, and the relationship between software and its environment.*
- *The graduate describes information technology systems and their role in converting data to organizational knowledge.*
- *The graduate identifies the role of different types of software in a computing environment and explains the fundamentals of software development.*
- *The graduate evaluates ethical concerns involved in the use of technology.*
- *The graduate recognizes and describes functions of basic computer hardware components.*

IT Foundations

IT Foundations is the first course in a two-part series preparatory for the CompTIA A+ exam, Part I. Students will gain an understanding of personal computer components and their functions in a desktop system, as well as computer data storage and retrieval; classifying, installing, configuring, optimizing, upgrading, and troubleshooting printers, laptops, portable devices, operating systems, networks, and system security; recommending appropriate tools, diagnostic procedures, preventative maintenance and troubleshooting techniques for personal computer components in a desktop system; strategies for identifying, preventing, and reporting safety hazards and environmental/human accidents in a technological environments; and effective communication with colleagues and clients as well as job-related professional behavior.

This course covers the following competencies:

- *The graduate recommends appropriate strategies for classifying, installing, configuring, optimizing, and upgrading basic network types.*
- *The graduate recommends appropriate strategies for classifying, installing, configuring, optimizing, upgrading, and troubleshooting laptops and mobile devices.*

- *The graduate recommends appropriate strategies for classifying, installing, configuring, optimizing, upgrading, and troubleshooting printers.*
- *The graduate demonstrates an understanding of personal computer components and their function in a desktop system.*
- *The graduate demonstrates a basic working knowledge of computer data storage and information retrieval.*

IT Applications

IT Applications is a continuation of the IT Foundations course preparatory for the CompTIA A+ exam, Part II. Students will gain an understanding of personal computer components and their functions in a desktop system. Also covered is computer data storage and retrieval, including classifying, installing, configuring, optimizing, upgrading, and troubleshooting printers, laptops, portable devices, operating systems, networks, and system security. Other areas include recommending appropriate tools, diagnostic procedures, preventative maintenance and troubleshooting techniques for personal computer components in a desktop system. The course then finished with strategies for identifying, preventing, and reporting safety hazards and environmental/human accidents in a technological environments, and effective communication with colleagues and clients as well as job-related professional behavior.

This course covers the following competencies:

- *The graduate recommends appropriate strategies for classifying, controlling access, setting permission, configuring, optimizing, and upgrading basic system security.*
- *The graduate recommends appropriate strategies for classifying, installing, configuring, optimizing, upgrading, and troubleshooting laptops, tablets, and mobile devices.*
- *The graduate recommends appropriate strategies for classifying, installing, configuring, optimizing, upgrading, and troubleshooting computer operating systems.*
- *The graduate recommends appropriate tools, diagnostic procedures, preventive maintenance, and troubleshooting techniques for personal computer components in a desktop system.*

General Education

Critical Thinking and Logic

Reasoning and Problem Solving helps students internalize a systematic process for exploring issues that takes them beyond an unexamined point of view and encourages them to become more self-aware thinkers by applying principles of problem identification and clarification, planning and information gathering, identifying assumptions and values, analysis and interpretation of information and data, reaching well-founded conclusions, and identifying the role of critical thinking in the disciplines and professions.

This course covers the following competencies:

- *The graduate recognizes the value of critical thinking in identifying and understanding the underlying structures of the disciplines and professions.*
- *The graduate evaluates different sources representing a range of perspectives on a problem in order to weigh the implications and consequences of different solutions to the problem.*
- *The graduate synthesizes information to understand a problem's complexities and potential solutions, and then evaluates the reasoning and evidence in support of these different solutions.*
- *The graduate identifies internal and external biases and assumptions related to a problem, and evaluates the influence and validity of these biases and assumptions.*
- *The graduate logically brings together information to arrive at a viable solution to a problem, and then clearly and accurately communicates the results.*
- *The graduate analyzes open-ended problems by learning about the problem and evaluating the accuracy and relevance of different perspectives on the problem.*

Introduction to Communication

This introductory communication course allows students to become familiar with the fundamental communication theories and practices necessary to engage in healthy professional and personal relationships. Students will survey human communication on multiple levels and critically apply the theoretical grounding of the course to interpersonal, intercultural, small group, and public presentational contexts. The course also encourages students to consider the influence of language, perception, culture, and media on their daily communicative interactions. In addition to theory, students will engage in the application of effective communication skills through systematically preparing and delivering an oral presentation. By practicing these fundamental skills in human communication, students become more competent communicators as they develop more flexible, useful, and discriminatory communicative practices in a variety of contexts.

This course covers the following competencies:

- *The graduate applies foundational elements of effective communication.*
- *The graduate applies appropriate communication strategies in interpersonal and group contexts*
- *The graduate utilizes appropriate presentational communication strategies in personal and professional settings.*

English Composition I

This course introduces learners to the types of writing and thinking that is valued in college and beyond. Students will practice writing in several genres and several media, with emphasis placed on writing and revising academic arguments. The course contains supporting media, articles, and excerpts to support a focus on one of five disciplinary threads (covering the topics of nursing, business, information technology, teaching, and literature, art, and culture) designed to engage students and welcome them into discussion about contemporary issues. The course supports peer review activities, though it may be completed asynchronously as well. Instruction and exercises in grammar, mechanics, research documentation, and style are paired with each module so that writers can practice these skills as necessary. This course includes full access to the MindEdge Writing Pad to support student writing and coaching sessions.

This course covers the following competencies:

- *The graduate integrates credible and relevant sources into written arguments.*
- *The graduate uses appropriate writing and revision strategies*
- *The graduate composes an appropriate argumentative essay for a given context.*
- *The graduate composes an appropriate narrative for a given context.*
- *The graduate appropriately uses a given writing style.*
- *The graduate selects appropriate rhetorical strategies that improve writing and argumentation.*
- *The graduate applies appropriate grammatical rules, sentence structure, and writing conventions.*

English Composition II

English Composition II introduces learners to research writing and thinking that are valued in college and beyond. The Composition II course at WGU should be seen as a foundational course designed to help undergraduate students build fundamental skills for ongoing development in writing and research. Students will complete an academic research paper.

This course covers the following competencies:

- *The graduate applies steps of the writing process appropriately to improve quality of writing.*
- *The graduate composes an argumentative research paper.*
- *The graduate evaluates the quality, credibility, and relevance of evidence in order to integrate evidence into a final research paper.*

College Algebra

This course provides further application and analysis of algebraic concepts and functions through mathematical modeling of real-world situations. Topics include: real numbers, algebraic expressions, equations and inequalities, graphs and functions, polynomial and rational functions, exponential and logarithmic functions, and systems of linear equations.

This course covers the following competencies:

- *The graduate simplifies and factors polynomial expressions, and solves polynomial equations.*
- *The graduate solves systems of linear equations and their related applications.*
- *The graduate simplifies rational, radical, and quadratic expressions, solves corresponding equations, and extends this knowledge to the study of functions.*
- *The graduate combines functions, finds inverse functions, solves exponential and logarithmic equations and functions.*
- *The graduate classifies and performs operations on real numbers; solves linear equations and inequalities; connects a linear equation to its graph; and identifies a function.*

Introduction to Humanities

This introductory humanities course allows students to practice essential writing, communication, and critical thinking skills necessary to engage in civic and professional interactions as mature, informed adults. Whether through studying literature, visual and performing arts, or philosophy, all humanities courses stress the need to form reasoned, analytical, and articulate responses to cultural and creative works. Studying a wide variety of creative works allows students to more effectively enter the global community with a broad and enlightened perspective.

This course covers the following competencies:

- *The graduate analyzes the primary contributions and characteristics of humanities during the Classical period.*
- *The graduate analyzes the primary contributions and characteristics of humanities during the Romantic period.*
- *The graduate assesses the development of humans through the study of key concepts, disciplines, and primary influences of the humanities.*
- *The graduate analyzes the primary contributions and characteristics of humanities during the Renaissance.*
- *The graduate analyzes the primary contributions and characteristics of humanities within the Neoclassical and Enlightenment period.*
- *The graduate analyzes the primary contributions and characteristics of humanities during the Realist movement.*

Introduction to Geography

This course will discuss geographic concepts, places and regions, physical and human systems and the environment.

This course covers the following competencies:

- *The graduate can describe and discuss fundamental concepts in geography.*
- *The graduate can describe and discuss environment.*
- *The graduate can describe and discuss human systems.*
- *The graduate can describe and discuss physical systems.*
- *The graduate can describe and discuss places and regions.*

Introduction to Physics

This course provides students with a comprehensive overview of the basic principles and unifying concepts of physics. Students will integrate conceptual knowledge with practical and laboratory skills. The primary audience of this course are IT majors with focus on application.

The course contains interactives, reading materials, and laboratory application to help students develop a broad understanding of the practical applications of scientific concepts. Instructional content is enhanced by e-interactives and

laboratory activities that will give students hands on knowledge and experience. Focus of materials are on why science is important to everyday life, practical application, and conceptual understanding. The quantitative aspects of physics will be explored as they relate to modern problems and challenges of the everyday world.

Asynchronous and cohort experiences may be part of the learning experience in which community will support the educational process.

This course covers the following competencies:

- *The graduate analyzes classical physics concepts to understand the world around them.*
- *The graduate analyzes principles of thermodynamics.*
- *The graduate analyzes concepts of modern physics.*
- *The graduate applies wave physics concepts to understand the world around them.*
- *The graduate applies concepts of electricity and magnetism to understand the world around them.*
- *The graduate critically analyzes the nature and process of science.*

Introduction to Probability and Statistics

In this course, students demonstrate competency in the basic concepts, logic, and issues involved in statistical reasoning. Topics include summarizing and analyzing data, sampling and study design, and probability.

This course covers the following competencies:

- *The graduate applies theoretical or empirical probability to a situation to quantify uncertainty.*
- *The graduate evaluates the sampling methods used in studies including the effect they have on conclusions that can be made.*
- *The graduate evaluates the relationship between two variables through the creation and interpretation of numerical summaries and visual displays.*
- *The graduate determines the probability of events using simulations, diagrams, and probability rules.*
- *The graduate evaluates categorical and quantitative data using appropriate numerical measures and graphical displays.*
- *The graduate designs and conducts observational studies, controlled experiments, and surveys to explore population characteristics.*

Network and Security

Network and Security - Foundations

Network and Security - Foundations introduces students to the components of a computer network and the concept and role of communication protocols. The course will cover widely used categorical classifications of networks (i.e. LAN, MAN, WAN, PAN, and VPN) as well as network topologies, physical devices, and layered abstraction. The course will also introduce students to basic concepts of security covering vulnerabilities of networks and mitigation techniques, security of physical media, and security policies and procedures.

This course covers the following competencies:

- *The graduate identifies the functional and technical components of network systems.*
- *The graduate identifies the basic concepts essential to network security.*
- *The graduate identifies the basic concepts essential to networking.*

Networks

Networks focuses on: network topologies including: protocols, ports, addressing schemes, routing, and wireless

communication standards; physical and logical topologies, including wiring standards; differentiating, installing, and configuring network devices; and troubleshooting network connectivity. This course prepares students for the following certification exam: CompTIA Network+.

This course covers the following competencies:

- *The graduate distinguishes and explains network topologies, including protocols, ports, addressing schemes, routing, and wireless communication standards.*
- *The graduate differentiates and explains network security devices and methods for troubleshooting common security threats.*
- *The graduate differentiates and installs/configures network devices.*
- *The graduate identifies appropriate methodologies for troubleshooting network connectivity and performance issues in a given network environment.*
- *The graduate differentiates and explains physical and logical topologies, including wiring standards.*
- *The graduate uses hardware and software utilities to track and maintain network performance in optimized state.*

Network and Security - Applications

This course prepares students for the following certification exam: CompTIA Security+.

This course covers the following competencies:

- *The graduate identifies security needs and recommends appropriate security practices for network infrastructures.*
- *The graduate evaluates risks associated with network security and recommends monitoring strategies and methods.*
- *The graduate recommends appropriate methods for controlling accessing data and information and for authenticating users and groups in gaining that access.*
- *The graduate identifies and explains the role of encryption in network security.*
- *The graduate identifies and discusses basic concepts of security and security threats, and recommends security procedures.*
- *The graduate explains and makes recommendations for appropriate security strategies and procedures for organizational operations.*

Web Development

Web Development Foundations

This course introduces students to web design and development by presenting them with HTML5 and CSS, the foundational languages of the web, by reviewing media strategies, and by using tools and techniques commonly employed in web development.

This course covers the following competencies:

- *The graduate develops a plan for creating and maintaining a website that addresses specific business needs while maintaining industry and ethical standards.*
- *The graduate creates web pages using a GUI editor as well as basic HTML5 and CSS 3 elements.*

Scripting and Programming

Scripting and Programming - Foundations

This course provides an introduction to programming covering data structures, algorithms, and programming paradigms. The course presents the student with the concept of an object as well as the object-oriented paradigm and its importance. A survey of languages is covered and the distinction between interpreted and compiled languages is introduced.

This course covers the following competencies:

- *The graduate integrates the object-oriented programming paradigm in scripting and programming.*
- *The graduate performs basic computer programming including working with data types, constants, variables, operator types, expressions, and functions.*
- *The graduate implements basic constructs of programming, including working with control structures.*
- *The graduate describes steps of the design process.*
- *The graduate analyzes algorithms, including algorithm efficiency, and recursion.*
- *The graduate compares various programming languages.*

Scripting and Programming - Applications

This course provides an introduction to programming. It covers data structures, algorithms, and programming paradigms. It presents the concept of an object as well as the object-oriented paradigm and its importance. A survey of languages is covered and the distinction between interpreted and compiled languages is introduced.

This course covers the following competencies:

- *The graduate declares, initializes, and assigns values to a variable and differentiates between primitive and object data types.*
- *The graduate defines programming languages, identifies common algorithms, and identifies the parts of the Java Programming Environment.*
- *The graduate utilizes decision and loop constructs to control the flow of a program.*
- *The graduate understands the object-oriented programming paradigm and identifies its elements.*

Data Management

Data Structures

Students will learn the fundamentals of dynamic data structures, such as bags, lists, stacks, queues, trees, hash tables, and their associated algorithms, using object-oriented design and abstract data types as a design paradigm. The course emphasizes problem solving and techniques applied to the design of efficient, maintainable software applications. Students will implement simple applications using the techniques learned.

This course covers the following competencies:

- *The graduate analyzes the time and space complexity of basic algorithms.*
- *The graduate describes tree structures and binary trees and implements a simple application involving building and searching a binary tree.*
- *The graduate describes the use of hash tables and bucket hashing as an efficient way to implement an associative ADT, and implements a simple application that uses bucket hashing.*
- *The graduate identifies basic selection and insertion sorting algorithms, as well as faster sorting algorithms, and describes the design and implementation of sorted lists.*
- *The graduate explains how to design abstract data types (ADTs), data structures to represent an ADT in storage, and algorithms to manipulate ADTs (using the bag ADT as an example) and describes bag data types and the use of both sequential and linked allocation to implement them.*
- *The graduate describes how to use searching algorithms for lists and explains the concept of a dictionary as an associative ADT.*
- *The graduate describes design, specification, and implementation of stacks, queues, and deques and implements a simple application using sequentially allocated queues as well as stacks that employ a linked allocation.*

- *The graduate describes design, specification, and implementation of list structures.*

Data Management - Foundations

This course introduces students to the concepts and terminology used in the field of data management. They will be introduced to Structured Query Language (SQL) and will learn how to use Data Definition Language (DDL) and Data Manipulation Language (DML) commands to define, retrieve, and manipulate data. This course covers differentiations of data—structured vs. unstructured and quasi-structured (relational, hierarchical, XML, textual, visual, etc); it also covers aspects of data management (quality, policy, storage methodologies). Foundational concepts of data security are included.

This course covers the following competencies:

- *The graduate explains how data, databases, and data management are used in today's organizations.*
- *The graduate analyzes the relational model of data.*
- *The graduate interprets the concepts of analytical processing within the context of business intelligence.*
- *The graduate implements SQL concepts and coding.*
- *The graduate demonstrates appropriate strategies to normalize data.*
- *The graduate demonstrates an understanding of the concepts involved in the modeling of data.*

Data Management - Applications

This course covers conceptual data modeling and provides an introduction to MySQL. Students will learn how to create simple to complex SELECT queries including subqueries and joins, and will also learn how to use SQL to update and delete data. Topics covered in this course include exposure to MySQL; developing physical schemas; creating and modifying databases, tables, views, foreign keys/primary keys (FKs/PKs), and indexes; populating tables; and developing simple Select-From-Where (SFW) queries to complex 3+ table join queries.

This course covers the following competencies:

- *The graduate creates conceptual data models and translates them into physical schemas.*
- *The graduate writes code to create and modify tables and views employing SQL Data Definition Language (DDL) in MySQL environment.*
- *The graduate creates simple Select-From-Where (SFW) and complex 3+ table join queries with Data Manipulation Language (DML) in MySQL environment.*
- *The graduate populates tables with insert, update, and delete using DML in MySQL environment.*
- *The graduate creates databases utilizing SQL Data Definition Language (DDL) in MySQL environment.*
- *The graduate writes code to create and modify Primary Keys (PKs) and Foreign Keys (FKs) and Indexes with SQL Data Definition Language (DDL) in MySQL environment.*

Structured Query Language

This course focuses on structured query language (SQL). It starts with a review of the basic statements and continues on to the creation of complex queries that affect multiple tables and utilize SQL functions. Data manipulation language (DML) and data definition language (DDL) are also covered, thus enabling the student to create and maintain database objects and modify data by using SQL commands.

This course covers the following competencies:

- *The graduate implements advanced SQL queries, including join conditionals and set operations.*
- *The graduate implements standard SQL functions to update and query a table.*
- *The graduate applies use of basic SQL commands to select and query data from a table.*
- *The graduate demonstrates understanding of the conceptual and logical models associated with Oracle Database*

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- *The graduate manipulates SQL database objects.*
- *The graduate implements operations involved in manipulating data in an SQL table.*

Database Server Administration

This course covers the installation, configuration, and administration of database servers. Students will be introduced to all the logical and physical components of a database server and learn to set up a server in a network environment. Tools and strategies for access and space management will be covered, as well as backup, restoration, and upgrade techniques.

This course covers the following competencies:

- *The graduate manages Oracle user accounts.*
- *The graduate configures Oracle network components.*
- *The graduate performs Oracle backup procedures.*
- *The graduate performs data manipulation and database diagnostics using appropriate tools.*
- *The graduate manages mechanisms available for Oracle space management.*
- *The graduate utilizes conceptual and logical components associated with database management tools.*
- *The graduate performs data migration and upgrades using Oracle database methods.*

Data Wrangling with MongoDB

This course elaborates on concepts covered in Introduction to Data Science, helping to develop skills crucial to the field of data science and analysis. It explores how to wrangle data from diverse sources and shape it to enable data-driven applications—a common activity in many data scientists' routine.

Topics covered include gathering and extracting data from widely-used data formats, assessing the quality of data, and exploring best practices for data cleaning. This course also introduces MongoDB, covering the essentials of storing data and the MongoDB query language together with exploratory analysis using the MongoDB aggregation framework.

This course covers the following competencies:

- *The graduate ensures data cleanliness through auditing and intervention.*
- *The graduate composes queries and data analysis in a NoSQL database.*
- *The graduate conducts data extraction and wrangling with data in complex formats for parsing and scraping.*

Technical Writing

Technical Communication

This course covers basic elements of technical communication, including professional written communication proficiency; the ability to strategize approaches for differing audiences; and technical style, grammar, and syntax proficiency.

This course covers the following competencies:

- *The graduate creates various technically written artifacts using appropriate technical communication concepts.*
- *The graduate integrates basic elements of technical communication, including audience analysis, the writing process, correct grammar, and appropriate design elements.*
- *The graduate makes strategic and appropriate communication decisions based on the audience.*

Spreadsheets

Spreadsheets

The Spreadsheets course will help students become proficient in using spreadsheets to analyze business problems. Students will demonstrate competency in spreadsheet development and analysis for business/accounting applications (e.g., using essential spreadsheet functions, formulas, charts, etc.)

This course covers the following competencies:

- *The graduate creates charts to present spreadsheet data for use in a professional setting.*
- *The graduate creates functional, formatted spreadsheets using appropriate spreadsheet functions and formulas to solve business problems.*
- *The graduate demonstrates proficiency in using spreadsheet software to analyze business problems.*

Business of IT

Business of IT - Project Management

This course introduces the student to the project management & business analysis process within the context of an IT project. Fundamental concepts of project management will be covered including all phase of project management during a system life cycle including business analysis, requirements capturing, issue tracking, and release planning. Additional topics to include: development environments (dev, integration, QA, production), help desk and support, IT planning for business continuity. This course prepares students for the following certification exam: CompTIA Project+.

This course covers the following competencies:

- *The graduate implements, controls, and coordinates projects according to project plans.*
- *The graduate describes and explains key components of project plans.*
- *The graduate creates a project plan.*
- *The graduate explains the strategies and processes of project closure, acceptance, and delivery.*

Business of IT - Applications

This course introduces IT students to information systems (IS). The course includes important topics related to management of information systems (MIS), such as system development, and business continuity. The course also provides an overview of management tools and issue tracking systems.

This course covers the following competencies:

- *The graduate identifies the role of management in information systems and the necessity for security and contingency plans.*
- *The graduate defines the general principles of information systems (IS) and the role of IS in the business process within an organization.*
- *The graduate defines the different methods of system development and selects the appropriate method for a project.*
- *The graduate recognizes the need for support center tool, and identifies ways to manage the support processes.*

Data Science

Introduction to Data Science

This Introduction to Data Science course introduces the data analysis process and common statistical techniques necessary for the analysis of data. Students will ask questions that can be solved with a given data set, set up experiments, use statistics and data wrangling to test hypotheses, find ways to speed up their data analysis code, make their data set easier to access, and communicate their findings.

This course covers the following competencies:

- *The graduate describes the foundations of data science.*

- *The graduate creates a data set that is usable for analysis by applying data wrangling techniques.*
- *The graduate incorporates statistical techniques to assist with parametric, nonparametric, and linear regression analyses.*

Machine Learning

This course presents the end-to-end process of investigating data through a machine learning lens. Topics covered include: techniques for extracting data, identifying useful features that best represent data, a survey of commonly-used machine learning algorithms, and methods for evaluating the performance of machine learning algorithms.

This course covers the following competencies:

- *The graduate evaluates algorithm performance.*
- *The graduate describes machine learning goals, categories, and procedures.*
- *The graduate adjusts machine learning algorithms to optimize their performance by treating data anomalies, extracting data structures, and performing data transformations.*
- *The graduate determines appropriate regression algorithms to apply to data sets.*
- *The graduate determines appropriate classification algorithms to apply to data sets.*
- *The graduate determines appropriate clustering algorithms to apply to data sets.*

Data Analytics

Data Analysis with R

This course focuses on exploratory data analysis (EDA) utilizing R. EDA is an approach for summarizing and visualizing the important characteristics of a data set. Exploratory data analysis focuses on exploring data to understand the data's underlying structure and variables to develop intuition about the data set, to consider how that data set came into existence, and to decide how it can be investigated with more formal statistical methods.

This course covers the following competencies:

- *The graduate predicts an outcome based on the results of the exploratory data analysis.*
- *The graduate explains the principles and concepts of exploratory data analysis.*
- *The graduate conducts exploratory data analysis.*

Data Visualization

This course covers the application of design principles, human perception, color theory, and effective storytelling in the context of data visualization. It addresses presenting data to others, facilitating aspirations to be an analyst or data scientist, and advancing technology with visualization tools. Additionally, this course focuses on how to visually encode and present data to an audience.

This course covers the following competencies:

- *The graduate incorporates best practices for design with focus on presentation elements.*
- *The graduate designs an A/B test experiment to accurately validate and recommend appropriate changes.*
- *The graduate produces graphics from a given data set using visualization tools and techniques.*
- *The graduate defines key data elements in the context of data science.*
- *The graduate creates an interactive visualization that communicates the meaning of data to an appropriate audience.*

Data Analytics

This course covers the most common tools, techniques, and procedures involved in data analytics. Students will review all

the disciplines involved with data analytics learned in previous courses and get a better understanding of how they all relate to one another.

This course covers the following competencies:

- *The graduate compares characteristics associated with data quality, structure, consolidation, and search optimization.*
- *The graduate recommends best-fit solutions via the appraisal of data analysis and reporting scenarios.*
- *The graduate evaluates data sources for purpose, value, access, and applications.*
- *The graduate determines business decisions using data analysis.*
- *The graduate analyzes simulation modeling and simulation outputs.*

Capstone

IT Capstone Written Project

The capstone project consists of a technical work proposal, the proposal's implementation, and a post-implementation report that describes the graduate's experience in developing and implementing the capstone project. The capstone project should be presented and approved by the mentor in relation to the graduate's technical emphasis.

This course covers the following competencies:

- *The graduate integrates and synthesizes competencies from across the degree program and thereby demonstrates the ability to participate in and contribute value to the chosen professional field.*

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 administrative or accessibility issues. 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. The Student Services team provides a formal means by which you can express your views, which in turn will inform the decisions we make.

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>.