



Program Guidebook

Bachelor of Science, Data Management/Data Analytics

The B.S. in Data Management/Data Analytics is designed to prepare science 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, 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 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 2017. 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 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 doctoral-level 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 “passes,” these evaluators, who review your work anonymously, will provide you with instructional feedback to help you meet evaluation standards 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. It includes a list that can be referenced to determine the mobile friendliness of all core course materials used in a program.

[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* 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
American Politics and the US Constitution	3	2
IT Foundations	4	2
IT Applications	4	2
Natural Science Lab	2	2
Applied Probability and Statistics	3	3
Introduction to Humanities	3	3
Network and Security - Foundations	3	3
Introduction to Geography	3	3
Applied Algebra	3	4
Scripting and Programming - Foundations	3	4
Ethics in Technology	3	4
Integrated Physical Sciences	3	4
Spreadsheets	3	5
Scripting and Programming - Applications	4	5
Web Development Foundations	3	5
Introduction to Programming in Python	3	5
Data Management - Foundations	3	6
Data Management - Applications	4	6
Technical Communication	3	6
Networks	4	6
Business of IT - Project Management	4	7
Structured Query Language	4	7
Business of IT - Applications	4	7
Database Server Administration	6	8
Introduction to Data Science	4	8
Data Wrangling with MongoDB	3	8
Data Analysis with R	2	9

Course Description	CUs	Term
Machine Learning	3	9
Data Visualization	2	9
Data Structures and Algorithms I	4	9
Data Analytics	4	9
IT Capstone Written Project	4	10

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 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 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

Introduction to IT examines 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

English Composition I introduces learners to the types of writing and thinking that are valued in college and beyond. Students will practice writing in several genres with emphasis placed on writing and revising academic arguments. Instruction and exercises in grammar, mechanics, research documentation, and style are paired with each module so that writers can practice these skills as necessary.

Comp I is a foundational course designed to help students prepare for success at the college level.

There are no prerequisites for English Composition I.

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.*

American Politics and the US Constitution

American Politics and the US Constitution examines the evolution of representative government in the United States and the changing interpretations of the civil rights and civil liberties protected by the Constitution. This course will give students an understanding of the powers of the branches of the federal government, the continual tensions inherent in a federal system, the shifting relationship between state and federal governments, and interactions between elected officials and the ever-changing electorate. This course will focus on such topics as the role of a free press in a democracy, the impact of changing demographics on American politics, and the debates over and expansion of civil rights. Upon completion of the course, students should be able to explain the basic functions of the federal government, describe the forces that shape American policy and politics, and be better prepared to participate in America's civic institutions. This course has no prerequisite.

This course covers the following competencies:

- *The graduate explains how the structure and powers of the United States government interact to form public policy.*
- *The graduate examines the struggle to balance individual liberty, public order, and state's rights.*
- *The graduate describes the influence of competing political ideologies on the development of the United States government.*

- *The graduate examines the influence of the media, public opinion, and political discourse on American democracy.*
- *The graduate examines the influence of political parties, citizens, and non-governmental organizations on elections and other political processes inside a participatory democracy.*

Applied Probability and Statistics

Applied Probability and Statistics is designed to help students develop competence in the fundamental concepts of basic statistics including: introductory algebra and graphing; descriptive statistics; regression and correlation; and probability. Statistical data and probability are often used in everyday life, science, business, information technology, and educational settings to make informed decisions about the validity of studies and the effect of data on decisions. This course discusses what constitutes sound research design and how to appropriately model phenomena using statistical data. Additionally, the content covers simple probability calculations, based on events that occur in the business and IT industries. No prerequisites are required for this course.

This course covers the following competencies:

- *The graduate applies the operations, processes, and procedures of basic algebra to evaluate quantitative expressions, and to solve equations and inequalities*
- *The graduate applies principles and methods of probability-based mathematics to explain and solve problems.*
- *The graduate applies the operations, processes, and procedures of fractions, decimals, and percentages to evaluate quantitative expressions.*
- *The graduate evaluates the relationship between two quantitative variables through correlation and regression.*
- *The graduate evaluates the relationship between two variables through interpretation of visual displays and numerical measures.*
- *The graduate evaluates categorical and quantitative data pertaining to a single variable using appropriate graphical displays and numerical measures.*

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.*

Applied Algebra

Applied Algebra is designed to help you develop competence in working with functions, the algebra of functions, and using some applied properties of functions. You will start learning about how we can apply different kinds of functions to relevant, real-life examples. From there, the algebra of several families of functions will be explored, including linear, polynomial, exponential, and logistic functions. You will also learn about relevant, applicable mathematical properties of each family of functions, including rate of change, concavity, maximizing/minimizing, and asymptotes. These properties will be used to solve problems related to your major and make sense of everyday living problems. Students should complete Applied Probability and Statistics or its equivalent prior to engaging in Applied Algebra.

This course covers the following competencies:

- *The graduate applies exponential functions and their properties to real-world problems.*
- *The graduate verifies the validity of a given model.*
- *The graduate analyzes graphical depictions of real-world situations using functional properties.*
- *The graduate interprets the real-world meaning of various functions based on notation, graphical representations, and data representations.*
- *The graduate applies linear functions and their properties to real-world problems.*
- *The graduate applies polynomial functions and their properties to real-world problems.*
- *The graduate applies logistic functions and their properties to real-world problems.*

Ethics in Technology

Ethics in Technology examines the ethical considerations of technology in each of four categories: privacy, accuracy, property, and access. The course presents a range of technologies and issues that challenge technologists in the field of information ethics. Students are introduced to a decision-making process as informed by ethical frameworks that outline key ethical considerations within the technologies presented. Students will study specific cases to help inform their professional responsibilities in how to navigate the important controversies in topics such as surveillance, social media, hacking, data manipulation, plagiarism and piracy, artificial intelligence, responsible innovation, and the digital divide. This course has no prerequisites.

This course covers the following competencies:

- *The graduate explains how IT professionals address ethical challenges regarding data property.*
- *The graduate explains the role of ethical principles (i.e. theories, concepts, frameworks) in ethical decision-making in the information age.*
- *The graduate explains how IT professionals address ethical challenges regarding data access.*
- *The graduate explains how IT professional address the role of professionals standards and codes of conduct in ethical decision-making.*
- *The graduate explains how IT professionals address ethical challenges regarding data accuracy.*
- *The graduate explains how IT professionals address ethical challenges regarding data privacy.*

General Science Content

Natural Science Lab

This course gives you an introduction to using the scientific method and engaging in scientific research to reach conclusions about the natural world. You will design and carry out an experiment to investigate a hypothesis by gathering quantitative data.

This course covers the following competencies:

- *The graduate accurately executes the process of scientific inquiry through experimentation in the natural world.*
- *The graduate draws conclusions based on academic research and scientific inquiry.*
- *The graduate evaluates academic sources for their credibility and relevance to a chosen research topic on a natural world phenomenon.*

Integrated Physical Sciences

This course provides students with an overview of the basic principles and unifying ideas of the physical sciences: physics, chemistry, and Earth sciences. Course materials focus on scientific reasoning and practical and everyday applications of physical science concepts to help students integrate conceptual knowledge with practical skills.

This course covers the following competencies:

- *The graduate describes the underlying organization, interactions, and processes within the Earth system including the Earth's structure and atmosphere, and Earth's interactions within the solar system.*
- *The graduate describes the nature and process of science.*
- *The graduate examines applications of physics including fundamental concepts such as forces, motion, energy, and waves.*
- *The graduate examines applications of key chemistry concepts including the structure of matter and the behavior and conservation of matter in chemical reactions.*

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 covers widely used categorical classifications of networks (e.g., LAN, MAN, WAN, WLAN, PAN, SAN, CAN, and VPN) as well as network topologies, physical devices, and layered abstraction. The course also introduces students to basic concepts of security covering vulnerabilities of networks and mitigation techniques, security of physical media, and security policies and procedures. This course has no prerequisites.

This course covers the following competencies:

- *The graduate identifies network security concepts to support security practices within an organization.*
- *The graduate determines appropriate network security operations to protect an organization's assets and networks.*
- *The graduate identifies core networking concepts to support networking operations within an organization.*

Networks

Networks for undergraduates focuses on the general concepts and applications of computer operating systems and network topologies. The fundamental knowledge and skills gained in this course prepares students for the CompTIA Network+ (N10-007) certification exam. C172 is a pre-requisite for this course, and should be completed prior to beginning Networks, C480.

This course covers the following competencies:

- *The graduate troubleshoots network issues in support of an organization's operations.*
- *The graduate manages network security to protect an organization.*

- *The graduate manages networks to support an organization's operations.*
- *The graduate configures basic networking components to support an organization's operations.*
- *The graduate manages a network infrastructure to support an organization's operations.*

Scripting and Programming

Scripting and Programming - Foundations

Scripting and Programming - Foundations provides an introduction to programming, covering basic elements such as variables, data types, flow control, and design concepts. The course is language-agnostic in nature, ending in a survey of languages and introduces the distinction between interpreted and compiled languages. There are no prerequisites for this course.

This course covers the following competencies:

- *The graduate examines basic computer programming elements, including data types, constants, variables, operators, and expressions.*
- *The graduate compares various scripting and programming languages.*
- *The graduate interprets algorithms.*
- *The graduate describes steps of the software design process.*
- *The graduate determines how to achieve programming goals through functions and control structure.*

Introduction to Programming in Python

Introduction to Programming in Python provides the fundamentals of the Python language and its features to control program flow and to manipulate data sets. This course teaches how to develop Python scripts that extract and manipulate data from unstructured data sources. Python libraries including acquisition and configuration are also covered. Scripting and Programming Foundations and Web Development Foundations are prerequisites to this course.

This course covers the following competencies:

- *The graduate constructs functions and control structures to interact with data structures and direct program flow.*
- *The graduate writes code in the Python environment, incorporating libraries to support data analytics tasks including data collection, manipulation, and storage.*
- *The graduate integrates Python elements including data types, constants, variables, operators, and expressions to create programming solutions.*

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.*

Software

Scripting and Programming - Applications

Scripting and Programming - Applications for undergraduates explores the various aspects of the C++ programming language by examining its syntax, the development environment, and tools and techniques to solve some real-world problems.

This course covers the following competencies:

- *The graduate writes code that implements decision and loop constructs to control the flow of a program.*
- *The graduate applies pointers to solve complex problems.*
- *The graduate applies object-oriented programming concepts in order to create a basic application.*
- *The graduate applies fundamental programming concepts in a specific programming environment.*
- *The graduate prepares code which declares, initializes, and assigns values to variables of appropriate types as part of the application development process.*
- *The graduate creates arrays in order to solve complex problems.*
- *The graduate writes code that creates and manipulates functions and files.*

Web Development

Web Development Foundations

This course prepares students for the CIW Site Development Associate certification. The 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.*

Data Management

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.*

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 Communication

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 makes strategic and appropriate communication decisions based on the audience.*
- *The graduate integrates basic elements of professional discourse, including audience analysis, the writing process, correct grammar, and appropriate design elements, into technical communication artifacts.*

Business of IT

Business of IT - Project Management

In this course, students will build on industry standard concepts, techniques, and processes to develop a comprehensive foundation for project management activities. During a project's life cycle, students will develop the critical skills necessary to initiate, plan, execute, monitor, control, and close a project. Students will apply best practices in areas such as scope management, resource allocation, project planning, project scheduling, quality control, risk management, performance measurement, and project reporting. This course prepares students for the following certification exam: CompTIA Project+.

This course covers the following competencies:

- *The graduate determines project tools and documentation methods to measure and monitor project performance.*
- *The graduate applies communication methods and change control processes to maintain clarity of project plans, activities, and changes for stakeholders.*
- *The graduate determines the impact of project constraints and influences to manage risk.*
- *The graduate applies key project management processes to guide business initiatives.*

Business of IT - Applications

Business of IT – Applications examines Information Technology Infrastructure Library (ITIL®) terminology, structure, policies, and concepts. Focusing on the management of Information Technology (IT) infrastructure, development, and operations, students will explore the core principles of ITIL practices for service management to prepare them for careers as IT professionals, business managers, and business process owners. This course has no prerequisites.

This course covers the following competencies:

- *The graduate analyzes service management processes and the process model in order to effectively deliver IT services to customers.*
- *The graduate describes the various processes central to IT service management in order to contextualize each process within an organization's overarching service management approach.*
- *The graduate analyzes how the ITIL Service Lifecycle's integrated approach provides value to organizations in order to work effectively on IT teams.*
- *The graduate describes the service desk function, the technical management function, the application management function, and the IT operations management function in order to contextualize each function within an organization's overarching service management approach.*
- *The graduate deconstructs service management, service design, and continual service improvement in order to optimize service value for customers and organizations.*
- *The graduate analyzes how different roles and responsible, accountable, consulted, and informed characterizations work together in order to understand the opportunities and constraints the graduate is likely to experience when working on teams in a service management workplace.*
- *The graduate articulates service management concepts with ITIL vocabulary in order to effectively communicate about IT service management in the workplace.*

Data Manipulation

Structured Query Language

This course prepares the student for the Oracle Database SQL (1Z0-071) certification exam. Students will master the SQL language that will allow them to restrict and sort data, create schema objects, control user access, and manage data, objects and tables.

This course covers the following competencies:

- *The graduate performs advanced operations in the creation and management of schema objects.*
- *The graduate describes the foundational elements of Oracle SQL.*
- *The graduate implements advanced functions.*
- *The graduate creates advanced queries.*
- *The graduate implements secure rights and privileges for user access.*

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

Data Visualization 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, and advancing technology with visualization tools enabling data scientists to share their findings and support organizational decision-making processes. 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 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.*

Computer Science

Data Structures and Algorithms I

Data Structures and Algorithms I covers the fundamentals of dynamic data structures, such as bags, lists, stacks, queues, trees, hash tables, and their associated algorithms. With Python software as the basis, the course discusses object-oriented design and abstract data types as a design paradigm. The course emphasizes problem solving and techniques for designing efficient, maintainable software applications. Students will implement simple applications using the techniques learned. This course has one prerequisite: Software 1.

This course covers the following competencies:

- *The graduate decides on an efficient algorithm for developing usable software.*
- *The graduate determines the appropriate implementation of data types to design efficient and maintainable software.*
- *The graduate determines which dynamic data structures are applicable for developing scalable software.*

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 program 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, thereby demonstrating 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>.