WESTERN GOVERNORS UNIVERSITY

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Program Guidebook

Bachelor of Science, Network Engineering and Security

In response to an increasing demand for network engineering and security professionals, the Bachelor of Science, Network Engineering and Security (BSNES) degree program prepares IT professionals to apply knowledge and experience in network design, network engineering, network troubleshooting, network automation, network security, and cloud security to manage network infrastructure and secure data through effective IT policies and procedures. Courses deliver proven methods for network administration and operations to ensure uptime, performance, resources, and security of networks to meet the needs of the organization. The program builds upon a core IT curriculum: systems and services, networking and security, scripting and programming, data management, business of IT, and web development. Students seeking the BS, Network Engineering and Security degree demonstrate additional competencies in this area by taking and passing specific industry certification exams that are vendor agnostic.

Understanding the Competency-Based Approach

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

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

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

Accreditation

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

The Degree Plan

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

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

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

How You Will Interact with Faculty

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

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

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

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

Connecting with Other Mentors and Fellow Students

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

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

Orientation

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

Transferability of Prior College Coursework

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

Click here for the Student Handbook

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

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

Continuous Enrollment, On Time Progress, and Satisfactory Academic Progress

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

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

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

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

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

Courses

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

Learning Resources

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

Mobile Compatibility:

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

Student Handbook article: Can I use my mobile device for learning resources?

Standard Path

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

Standard Path *for* Bachelor of Science, Network Engineering and Security

Course Description	CUs	Term
Introduction to IT	4	1
IT Applications	4	1
IT Foundations	4	1
Ethics in Technology	3	2
Network and Security - Foundations	3	2
Linux Foundations	3	2
Applied Probability and Statistics	3	2
Introduction to Spreadsheets	1	2
Composition: Writing with a Strategy	3	3
Business of IT – Applications	4	3
Web Development Foundations	3	3
Introduction to Physical and Human Geography	3	3
Applied Algebra	3	4
Discrete Math: Logic	1	4
Networks	4	4
Critical Thinking: Reason and Evidence	3	4
Discrete Math: Functions and Relations	1	4
Network Analytics and Troubleshooting	3	5
Network and Security - Applications	4	5
Discrete Math: Algorithms and Cryptography	1	5
Introduction to Cryptography	4	5
Managing Cloud Security	4	6
Integrated Physical Sciences	3	6
Telecomm and Wireless Communications	3	6
Cloud Applications	3	6
Internet of Things (IoT) and Infrastructure	3	7
Data Management - Foundations	3	7
Scripting and Programming - Foundations	3	7
Python for IT Automation	3	7
Software Defined Networking	3	8
Version Control	1	8
Network Automation and Deployment	3	8
Technical Communication	3	8
Introduction to Systems Thinking	3	8
IT Leadership Foundations	3	9

Course Description	CUs	Term
Business of IT - Project Management	4	9
BSNES Capstone 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. 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, Network Engineering and Security

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:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner explains different computer hardware and networking technologies and their developments.*
- *The learner describes fundamental data management functions in databases.*
- *The learner identifies components of software and its relation to operating systems.*
- *The learner identifies computer hardware components.*
- *The learner describes the structure, function, and security associated with networks.*
- *The learner describes the basics of programming languages in software development.*
- *The learner describes the role of the IT department in IT infrastructure management, disaster recovery, and business continuity processes.*
- *The learner evaluates ethical concerns in information technology.*

IT Applications

IT Applications introduces skills in identifying operating systems and their configurations and in implementing security principles across devices and networks. Learners will also gain skills in troubleshooting software, security, and malware issues, and in implementing basic operational procedures in documentation, change management, compliance, and communication. The course will introduce basic disaster recovery and business continuity procedures, scripting basics, and remote access technology solutions. The course prepares learners for the CompTIA A+ Core 2 certification exam.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner identifies operating systems and their configurations.*
- *The learner implements security principles across devices and networks.*
- *The learner troubleshoots software, security, and malware issues.*
- *The learner implements basic operational procedures in documentation, change management, compliance, and communication.*
- *The learner implements basic disaster recovery and business continuity procedures.*
- *The learner identifies scripting basics.*
- *The learner identifies remote access technology solutions.*

IT Foundations

IT Foundations provides learners with an understanding of personal computer components and their functions in a desktop

system; a knowledge of computer data storage and retrieval; and skills in classifying, installing, configuring, optimizing, upgrading, and troubleshooting printers, laptops, portable devices, operating systems, networks, and system security. This course also gives learners the ability to recommend 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 or human accidents in technological environments; and effective communication skills for interacting with colleagues and clients, including job-related professional behavior. The course prepares learners for the CompTIA A+ Core 1 certification exam.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner configures common hardware and software components of mobile devices.*
- *The learner configures wired and wireless networks.*
- *The learner configures common hardware in computer systems.*
- *The learner creates client-side virtualization with cloud computing components.*
- *The learner troubleshoots hardware, software, and network issues with best practice methodologies.*

Introduction to Spreadsheets

The Introduction to 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 applications (e.g., using essential spreadsheet functions, formulas, tables, charts, etc.). Introduction to Spreadsheets has no prerequisites.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner creates formatted spreadsheets, using appropriate functions to organize and present data effectively.*
- *The learner applies appropriate formulas and functions to aggregate and summarize spreadsheet data.*
- *The learner creates tables to summarize and analyze data to make decisions.*
- *The learner creates data visualizations using charts and graphs for use in a professional setting.*

General Education

Ethics in Technology

Ethics in Technology examines the ethical considerations of technology use in the 21st century and introduces students to a decision-making process informed by ethical frameworks. Students will study specific cases related to important 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:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner implements ethical decision-making frameworks in the information age.*
- *The learner describes ethical issues regarding data privacy, accuracy, access, and security.*
- *The learner explains professional ethical codes and their role in guiding professional behavior.*
- *The learner identifies interventions for personal bias and related legal concerns.*

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:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The graduate applies the operations, processes, and procedures of fractions, decimals, and percentages to evaluate quantitative expressions.*
- *The graduate applies the operations, processes, and procedures of basic algebra to evaluate quantitative expressions, and to solve equations and inequalities.*
- *The graduate evaluates categorical and quantitative data pertaining to a single variable using appropriate graphical displays and numerical measures.*
- *The graduate evaluates the relationship between two variables through interpretation of visual displays and numerical measures.*
- *The graduate evaluates the relationship between two quantitative variables through correlation and regression.*
- *The graduate applies principles and methods of probability-based mathematics to explain and solve problems.*

Composition: Writing with a Strategy

Welcome to Composition: Writing with a Strategy! In this course, you will focus on three main topics: understanding purpose, context, and audience, writing strategies and techniques, and editing and revising. In addition, the first section, will offer review on core elements of the writing process, cross-cultural communication, as well as working with words and common standards and practices.
Each section includes learning opportunities through readings, videos, audio, and other relevant resources. Assessment activities with feedback also provide opportunities to check your learning, practice, and show how well you understand course content. Because the course is self-paced, you may move through the material as quickly or as slowly as you need to gain proficiency in the seven competencies that will be covered in the final assessment. If you have no prior knowledge or experience, you can expect to spend 30-40 hours on the course content.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner writes with purpose for a given context and target audience.*
- *The learner incorporates writing strategies and techniques for written communication.*
- *The learner constructs a written document with correct format, style, structure, and grammar.*
- *The learner formulates a strategy for editing and revising written text.*
- *The learner composes constructive feedback of written texts.*

Introduction to Physical and Human Geography

This is Introduction to Physical and Human Geography, a three-module course that addresses the question of what geography really is in today's complex world; how migration affects—and has been affected by—geography; and one of the biggest present problems related to geography: climate change. Because the course is self-paced, you may move through the material as quickly or as slowly as you need to, with the goal of demonstrating proficiency in the five competencies covered in the final assessment. If you have no prior knowledge of this material, you can expect to spend 30–40 hours on the course content.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner analyzes the message of a data visualization for a specific purpose.*
- *The learner interprets complex global systems through the lenses of physical and human geography.*
- *The learner analyzes the various causes and effects of human migration.*
- *The learner analyzes the connections among the various factors contributing to climate change.*
- *The learner applies logical reasoning to the analysis of climate change.*

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:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner interprets the real-world meaning of various functions based on notation, graphical representations, and data representations.*
- *The learner applies linear functions and their properties to real-world problems.*
- *The learner applies polynomial functions and their properties to real-world problems.*
- *The learner applies exponential functions and their properties to real-world problems.*
- *The learner applies logistic functions and their properties to real-world problems.*
- *The learner analyzes graphical depictions of real-world situations using functional properties.*
- *The learner verifies the validity of a given model.*

Discrete Math: Logic

Discrete Math-Logic is designed to help students develop competence in the use of logic and proofs and Boolean Algebra and Boolean functions. Applied Probability and Statistics and Applied Algebra are prerequisites for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner evaluates the truth of statements using proofs and the principles of deductive logic.*
- *The learner minimizes circuits using Boolean algebra and Boolean functions.*

Critical Thinking: Reason and Evidence

In this course you will learn key critical thinking concepts and how to apply them in the analysis and evaluation of reasons and evidence. The course examines the basic components of an argument, the credibility of evidence sources, the impact of bias, and how to construct an argument that provides good support for a claim. The course consists of an introduction and four major sections. Each section includes learning opportunities through readings, videos, audio, and other relevant resources. Assessment activities with feedback also provide opportunities to check your learning, practice, and show how well you understand course content. Because the course is self-paced, you may move through the material as quickly or as slowly as you need to gain proficiency in the four competencies that will be covered in the final assessment. If you have no prior knowledge or experience, you can expect to spend 30-40 hours on the course content.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner evaluates the quality of an argument.*
- *The learner evaluates evidence based on source credibility.*
- *The learner evaluates bias and its impact.*
- *The learner makes claims based on evidence.*

Discrete Math: Functions and Relations

Discrete Math: Functions and Relations is designed to help students develop competence in the use of abstract discrete structures fundamental to systems networking. In particular, this course will introduce students to set theory, finite sequences, series, and relations. Discrete Math: Logic, Applied Probability and Statistics, and Applied Algebra are prerequisites for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner analyzes relationships between sets and functions.*
- *The learner analyzes mathematical problems using relations and directed graphs.*

Discrete Math: Algorithms and Cryptography

Discrete Math: Algorithms and Cryptography addresses discrete computational methods, including searching and sorting algorithms, big-O estimates, and number theory and cryptography. Discrete Math Functions and Relations is a prerequisite for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner analyzes linear algorithms and associated big-O estimates.*
- *The learner analyzes the use of number theory in cryptography.*

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, everyday applications of physical science concepts to help students integrate conceptual knowledge with practical skills.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner describes the nature and process of science.*
- *The learner examines applications of physics including fundamental concepts such as forces, motion, energy, and waves.*
- *The learner examines applications of key chemistry concepts including the structure of matter and the behavior and conservation of matter in chemical reactions.*
- *The learner 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.*

Technical Communication

Technical Communication introduces skills in editing professional communications, evaluating the impact of professional etiquette in digital environments, and in creating artifacts that are persuasive, informational, and research-based. The course also introduces skills in delivering multimedia presentations using professional verbal communication skills.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner edits corporate communications for proper grammar and punctuation.*
- *The learner evaluates the impact of business etiquette and communication in digital environments.*
- *The learner creates technical artifacts that are persuasive, informational, and research based.*
- *The learner delivers presentations with professional verbal communication skills and multimedia.*

Introduction to Systems Thinking

Introduction to Systems Thinking provides learners with the skills required to engage in a holistic systems-based approach to analyzing complex problems and solutions. This course introduces the foundational concepts and principles of systems thinking and provides opportunities to use a systems thinking approach to analyze and evaluate real-world case studies. The course will culminate with using systems thinking to develop a solution to an authentic complex problem. This course has no prerequisites, but general education math (C955 or C957) is preferred. Because the course is self-paced, learners may move through the material as quickly or as slowly as needed, with the goal of demonstrating proficiency in the five

competencies covered in the final assessment. If learners have no prior knowledge of this material, they can expect to spend 30 to 40 hours on the course content.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner applies the basic principles and foundational theory of systems thinking to a scenario.*
- *The learner analyzes complex problems and solutions using a systems thinking methodology.*
- *The learner designs a solution to a complex problem using systems thinking.*

Network and Security

Network and Security - Foundations

Network and Security - Foundations introduces learners to the basic network systems and concepts related to networking technologies. Learners will gain skills in applying network security concepts for business continuity, data access, and confidentiality, and in identifying solutions for compliance with security guidance.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner identifies basic network systems and concepts related to networking technologies.*
- *The learner applies network security concepts for business continuity, data access, and confidentiality.*
- *The learner identifies solutions for compliance with security guidance.*

Network and Security - Applications

Network and Security - Applications prepares learners for the CompTIA Security+ certification exam. The course introduces learners to skills in identifying threats, attacks, and vulnerabilities to organizational security. The learner will also gain skills in designing security solutions for enterprise infrastructures and architectures, as well as in implementing security solutions across hardware, applications, and network services. Learners will be able to execute operations and incident response with tools, policies, forensics, and mitigation techniques, and to analyze information security controls, governance, risk, and compliance.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner identifies threats, attacks, and vulnerabilities to organizational security.*
- *The learner designs security solutions for enterprise infrastructures and architectures.*
- *The learner implements security solutions across hardware, applications, and network services.*
- *The learner executes operations and incident response with tools, policies, forensics, and mitigation techniques.*
- *The learner analyzes information security controls, governance, risk, and compliance.*

Cloud Applications

Cloud Applications prepares learners for the CompTIA Cloud+ certification exam. Learners will gain skills in designing cloud infrastructure and services and in recommending cloud security solutions, policies, and procedures. The course will also introduce skills in deploying cloud solutions for storage, networking, and security, and in managing cloud operations with processes, procedures, and improvements. Learners will also gain skills in troubleshooting cloud services issues in networking, security, and performance.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner designs cloud infrastructure and services.*
- *The learner recommends cloud security solutions, policies, and procedures.*

- *The learner deploys cloud solutions for storage, networking, and security.*
- *The learner manages cloud operations with processes, procedures, and improvements.*
- *The learner troubleshoots cloud services issues in networking, security, and performance.*

Operating Systems

Linux Foundations

Linux Foundations prepares learners for the LPI Linux Essentials certification, and is an introduction to Linux as an operating system as well as an introduction to open-source concepts and the basics of the Linux command line. Learners will gain skills in identifying the fundamentals of open-source software and to develop resources for data access and security.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner identifies the fundamentals of open-source software.*
- *The learner develops resources for data access and security.*

Business of IT

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, learners 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:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner applies Information Technology Infrastructure Library (ITIL) concepts, core components, principles, and models of service management.*
- *The learner applies the Information Technology Infrastructure Library (ITIL) six activities of the service value chain.*

IT Leadership Foundations

IT Leadership Foundations is an introductory course that provides students with an overview of organizational structures, communication, and leadership styles specific to information technology in organizations. It also introduces students to some of the power skills that help make successful IT professionals, including time management, problem solving, and emotional intelligence. Students in this course explore their own strengths and passions in relation to the field. There are no prerequisites for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner selects appropriate influential leadership strategies for workplace situations.*
- *The learner communicates ideas, opinions, and information suitable for various professional settings.*
- *The learner reflects on the emotional reactions of self and others in a variety of professional situations.*
- *The learner recommends strategies for decision-making in team environments.*

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:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner determines requirements of a project management plan.*
- *The learner identifies project factors, constraints, and risk strategies.*
- *The learner applies communication methods and change control processes within a project.*

Web Development

Web Development Foundations

Web Development Foundations introduces students to web design and development using HTML, XML, and Cascading Style Sheets (CSS), the foundational languages of the web. This course also covers how to troubleshoot problems using developer tools and integrated development environments commonly employed in web development. There are no prerequisites for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner creates the structure of basic web documents using HTML and XML.*
- *The learner implements web page formatting and interface aesthetics using CSS*
- *The learner resolves software problems in web development environments with debugging tools.*

Networks

Networks

Networks introduces skills in configuring networking components and a network infrastructure. Learners will gain skills in optimizing network operations for availability, performance, and security, and in troubleshooting network issues. The course prepares learners for the CompTIA Network+ certification exam. Network and Security - Foundations is a prerequisite for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner configures networking components.*
- *The learner configures a network infrastructure.*
- *The learner optimizes network operations for availability, performance, and security.*
- *The learner troubleshoots network issues.*
- *The learner implements network security techniques.*

Networking

Network Analytics and Troubleshooting

Network Analytics and Troubleshooting teaches students to use network monitoring and analytics tools and practices that are common in the workplace in order to troubleshoot and fix complex computer networks. Students will follow a customer service model in identifying, classifying, investigating, and repairing network outages or problems. This course is designed as a hands-on experience where students will implement these techniques in a virtual space in order to produce a secure and functional deployed network.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner identifies network problems with telemetry, software, and equipment.*

- *The learner performs network troubleshooting.*
- *The learner provides customer support in resolution of network issues.*

Telecomm and Wireless Communications

Telecomm and Wireless Communications explores the science, technologies, and standards that enable wired and wireless data to be transmitted across different media. Topics include data encoding and decoding, and analog and digital transmissions via wired, fiber, wireless, cellular, and satellite technologies.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner determines how to transmit data securely across multiple mediums.*
- *The learner designs wired and wireless network infrastructures in alignment with telecommunication standards.*

Python for IT Automation

Python for IT Automation covers the fundamentals of the Python language and its features to control program flow, inform decisions, and automate IT tasks and processes. The course emphasizes a systematic approach to solving problems and the application of programming logic to administer secure, scalable, and resilient IT networks and systems.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner applies Python principles and syntax to manage variables, data structures, and operators and to perform IT tasks.*
- *The learner creates Python scripts using control structures to automate systems tasks.*
- *The learner integrates Python scripts, modules, packages, and libraries to automate networking tasks and processes.*

Software Defined Networking

Software-Defined Networking (SDN) represents one of the fastest growing areas of network engineering. This course instructs learners on the SDN paradigm, which encompasses network automation, intent-based networking, and centralized network control. This course also teaches learners to view networking from a centralized and automated perspective rather than the traditional device-by-device model that is the legacy practice in many networks.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner articulates use cases and opportunities for software defined networking (SDN).*
- *The learner identifies software defined networking (SDN) concepts and services used in development of network infrastructures.*
- *The learner determines how to maintain secure networks with software defined networking (SDN) principles.*
- *The learner determines how to maintain networks with centralized monitoring and troubleshooting processes.*

Network Automation and Deployment

Network Automation and Deployment leverages previous experience in networking, scripting, and programming with the SDN paradigm. Students will create programs and scripts that automate network configuration across large networks. This course is designed as a hands-on experience where students will implement these techniques in a virtual space in order to produce a secure and functional deployed network.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner uses industry standard tools for automation and scripting.*
- *The learner develops automated solutions with scripting and APIs for continuous integration.*

- *The learner manages automation processes with troubleshooting and maintenance.*

BSNES Capstone Project

The BSNES Capstone Project consists of learners submitting a network design proposal, a virtual network implementation, and a post-implementation report describing their experience developing and implementing the capstone project. The capstone project and scope must be presented and approved by the capstone instructor prior to implementation in the virtual environment.

This course covers the following competencies:

- *The learner designs network infrastructures and system standards that address business needs.*
- *The learner deploys validated network infrastructure solutions.*

Information Assurance

Introduction to Cryptography

Introduction to Cryptography introduces skills in applying cryptography principles in alignment with organizational and information security guidelines. Students will determine requirements and techniques for cryptanalysis. This course builds skills in implementing encryption methods with symmetric and asymmetric algorithms.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner applies cryptography principles in alignment with organizational and information security guidelines.*
- *The learner implements encryption methods with symmetric and asymmetric algorithms.*

Web and Cloud Security

Managing Cloud Security

Managing Cloud Security prepares learners to safeguard cloud data with identity and access management and to implement secure solutions in cloud service models. Learners will be introduced to skills in identifying security policies and procedures for cloud applications and in implementing operational capabilities, procedures, and training in relation to organizational needs. Learners will also gain skills in conducting risk analysis and risk management in alignment with disaster recovery and business continuity plans and in identifying legal, compliance, and ethical concerns.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner safeguards cloud data with identity and access management.*
- *The learner implements secure solutions in cloud service models.*
- *The learner implements operational capabilities, procedures, and training in relation to organizational needs.*
- *The learner identifies security policies and procedures for cloud applications.*
- *The learner conducts risk analysis and risk management in alignment with disaster recovery and business continuity plans.*
- *The learner identifies legal, compliance, and ethical concerns within a cloud environment.*

Information Technology Management

Internet of Things (IoT) and Infrastructure

Internet of Things (IoT) and Infrastructure introduces students to emerging technologies connecting the internet to a variety of physical objects. The course reviews the business requirements for sensors and securely storing, transmitting, and processing the data they generate. As new use cases emerge, ethical and privacy issues become relevant aspects of business development. There are no prerequisites for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner identifies Internet of Things (IoT) network and cloud architectures.*
- *The learner determines business requirements for data collection and analysis for the Internet of Things (IoT).*
- *The learner describes Internet of Things (IOT) security solutions.*
- *The learner defines requirements and parameters for Internet of Things (IOT) ethics, access, and privacy issues.*
- *The learner identifies emerging Internet of Things (IOT) use cases within organizations, marketplaces, and industries.*

Data Management

Data Management - Foundations

Data Management Foundations offers an introduction in creating conceptual, logical and physical data models. Students gain skills in creating databases and tables in SQL-enabled database management systems, as well as skills in normalizing databases. No prerequisites are required for this course

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner explains attributes of databases, database tables, and structured and associated query language (SQL) commands.*
- *The learner determines how to run queries for creation and manipulation of data in relational databases.*
- *The learner defines primary and foreign keys in data normalization.*

Scripting and Programming

Scripting and Programming - Foundations

Scripting and Programming - Foundations introduces programming basics 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. Learners will gain skills in identifying scripts for computer program requirements and in using fundamental programming elements as part of common computer programming tasks. Learners will also gain an understanding of the logic and outcome of simple algorithms.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner identifies scripts for computer program requirements.*
- *The learner uses fundamental programming elements as part of common computer programming tasks.*
- *The learner explains the logic and outcome of simple algorithms.*

Full Stack Engineering

Version Control

Version control is critical to maintaining software and enabling scalability solutions. A best practice for any programming project that requires multiple files uses version control. Version control enables teams to have collaborative workflows and enhances the software development lifecycle. This course introduces students to the basics of publishing, retrieving, branching, and cloning. There are no prerequisites for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner implements version control processes and solutions that maintains source code.*

Accessibility and Accommodations

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Need More Information? WGU Student Services

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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.

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