WESTERN GOVERNORS UNIVERSITY
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Program Guidebook

Bachelor of Science, Computer Science

The Bachelor of Science in Computer Science prepares students for a career in the high demand field of Computer Science. Upon program completion, students will apply their learned knowledge and skills in the designing, developing and optimizing of systems to meet current and future industry needs. The curriculum includes innovative courses in programming and logic, architecture and systems, data structures, project management, artificial intelligence, along with the theory and science of computing.

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 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 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, Computer Science

Course Description	CUs	Term
Introduction to IT	4	1
Applied Probability and Statistics	3	1
Web Development Foundations	3	1
Introduction to Geography	3	1
Network and Security - Foundations	3	2
Calculus I	4	2
English Composition I	3	2
Scripting and Programming - Foundations	3	2
Integrated Physical Sciences	3	3
Discrete Mathematics I	4	3
Discrete Mathematics II	4	3
Natural Science Lab	2	3
Introduction to Communication	3	4
Computer Architecture	3	4
Scripting and Programming - Applications	4	4
Data Management - Foundations	3	4
Data Management - Applications	4	5
American Politics and the US Constitution	3	5
Introduction to Humanities	3	5
Software I	6	5
Software II - Advanced Java Concepts	6	6
Business of IT - Project Management	4	6
Data Structures and Algorithms I	4	6
Data Structures and Algorithms II	4	7
Ethics in Technology	3	7
Fundamentals of Information Security	3	7
Operating Systems for Programmers	3	7
Software Engineering	4	8
Business of IT - Applications	4	8
Advanced Data Management	3	8
IT Leadership Foundations	3	8
Technical Communication	3	9
Introduction to Artificial Intelligence	3	9
Software Quality Assurance	3	9
Computer Science Capstone	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, Computer Science

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 graduate describes IT as a discipline and discusses the history and future of computing as well as the currently used infrastructure.*

- *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 recognizes and describes functions of basic computer hardware components.*

- *The graduate describes the structure, function, and security associated with networks.*

- *The graduate identifies common software architectures, development techniques, and the relationship between software and its environment.*

- *The graduate explains the structure and function of databases.*

- *The graduate explains the role of technology in today's business environment and describes basic concepts of project management.*

- *The graduate evaluates ethical concerns involved in the use of technology.*

General Education

Applied Probability and Statistics

Applied Probability and Statistics helps candidates 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 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.*

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:

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

- *The graduate can describe and discuss fundamental concepts in geography.*

- *The graduate can describe and discuss places and regions.*

- *The graduate can describe and discuss physical systems.*

- *The graduate can describe and discuss human systems.*

- *The graduate can describe and discuss environment.*

Calculus I

This course guides candidates to apply theoretical concepts of calculus to real-world situations, demonstrating a developing mathematical mindset. This course focuses on limits, derivatives, integrals, and differential equations; it also prepares students for Discrete Mathematics. Prerequisites may include an entrance exam that assesses pre-calculus skills, or readiness; alternatively, completion of pre-calculus within the past 3 – 5 years.

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 determines a limit numerically, algebraically, and graphically.*

- *The graduate analyzes derivatives and their properties.*

- *The graduate analyzes integrals and their properties.*

- *The graduate solves differential equations.*

English Composition I

English Composition I introduces candidates to the types of writing and thinking that are valued in college and beyond. Candidates 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. Composition I is a foundational course designed to help candidates prepare for success at the college level. There are no prerequisites for English Composition I.

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 appropriate grammatical rules, sentence structure, and writing conventions.*

- *The graduate selects appropriate rhetorical strategies that improve writing and argumentation.*

- *The graduate appropriately uses a given writing style.*

- *The graduate uses appropriate writing and revision strategies.*

- *The graduate integrates credible and relevant sources into written arguments.*

- *The graduate composes an appropriate narrative for a given context.*

- *The graduate composes an appropriate argumentative essay for a given context.*

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 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.*

- *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.*

Discrete Mathematics I

Discrete Mathematics I helps candidates develop competence in the use of abstract, discrete structures fundamental to computer science. In particular, this course will introduce candidates to logic and proofs; Boolean algebra and functions; set theory; finite and infinite sequences and series; and relations, graphs, and trees. The course emphasizes applications in computer science. Calculus I 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 graduate evaluates the truth of statements using proofs and the principles of deductive logic.*

- *The graduate analyzes relationships between sets and functions.*

- *The graduate minimizes circuits using Boolean algebra and Boolean functions.*

- *The graduate performs matrix operations.*

- *The graduate analyzes finite and infinite series.*

- *The graduate analyzes mathematical problems using relations.*

- *The graduate analyzes graphs, trees, and the associated data point connections.*

Discrete Mathematics II

Discrete Mathematics II addresses abstract, discrete, computational methods used in computer science. In particular, this class introduces searching and sorting algorithms; big-O estimates; number theory and cryptography; recursion and induction; counting and advanced counting techniques; discrete probability; and modeling computation. This course emphasizes applications in computer science. Discrete Mathematics I 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 graduate analyzes linear algorithms and associated big-O estimates.*

- *The graduate analyzes the use of number theory in cryptography.*

- *The graduate analyzes recursive elements of algorithms, using applicable induction principles.*

- *The graduate solves problems using counting principles.*

- *The graduate analyzes mathematical problems using discrete probability or Bayesian methods.*

- *The graduate determines computational models using deterministic and nondeterministic finite-state machines.*

Introduction to Communication

This introductory communication course allows candidates to become familiar with the fundamental communication theories and practices necessary to engage in healthy professional and personal relationships. Candidates 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 candidates to consider the influence of language, perception, culture, and media on their daily communicative interactions. In addition to theory, candidates 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, candidates become more competent communicators as they develop more flexible, useful, and discriminatory communicative practices in a variety of contexts. Note: There are references within this video to Taskstream. If Taskstream is not part of your student experience, please disregard, and locate your task(s) within your 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 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.*

American Politics and the US Constitution

American Politics and the U.S. 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 candidates 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 the 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, candidates 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:

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

- *The graduate describes the influence of competing political ideologies on the development of the United States government.*

- *The graduate explains how the structure and powers of the United States government interact to form public policy.*

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

- *The graduate examines the struggle to balance individual liberty, public order, and state's rights.*

- *The graduate examines the influence of the media, public opinion, and political discourse on American democracy.*

Introduction to Humanities

This introductory humanities course allows candidates 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 candidates to more effectively enter the global community with a broad and enlightened perspective.

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 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 Classical period.*

- *The graduate analyzes the primary contributions and characteristics of humanities during the Renaissance.*

- *The graduate analyzes the primary contributions and characteristics of humanities during the Neoclassical and Enlightenment period.*

- *The graduate analyzes the primary contributions and characteristics of humanities during the Romantic period.*

- *The graduate analyzes the primary contributions and characteristics of humanities during the Realism movement.*

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. Candidates are introduced to a decision-making process as informed by ethical frameworks that outline key ethical considerations within the technologies presented. Candidates 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:

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

- *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 privacy.*

- *The graduate explains how IT professionals address ethical challenges regarding data accuracy.*

- *The graduate explains how IT professionals address ethical challenges regarding data property.*

- *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.*

Web Development

Web Development Foundations

This course introduces students to web design and development by presenting them with HTML5 and Cascading Style Sheets (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:

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

- *The graduate creates web pages using a graphic user interface (GUI) editor as well as basic HTML5 and CSS 3 elements.*

- *The graduate develops a plan for creating and maintaining a website that addresses specific business needs while maintaining industry and ethical standards.*

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:

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

- *The graduate identifies fundamental networking concepts to support an organization.*

- *The graduate identifies the fundamentals of network security concepts to support an organization.*

- *The graduate determines appropriate network security operations to protect an organization's assets.*

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:

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

- *The graduate examines basic computer programming elements, including data types, constants, variables, operators, and expressions.*

- *The graduate determines how to achieve programming goals through functions and control structure.*

- *The graduate interprets algorithms.*

- *The graduate describes steps of the software design process.*

- *The graduate compares various scripting and programming languages.*

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:

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

- *The graduate evaluates academic sources for their credibility and relevance to a chosen research topic on a natural world phenomenon.*

- *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.*

Computer Science

Computer Architecture

Computer Architecture introduces students to concepts and characteristics of organization and architecture applied to modern computer systems including performance, processor, memory, input/output, and multiprocessors to optimize system design, performance, and efficiency.

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 evaluates performance of hardware and software interaction to maximize system capabilities.*

- *The graduate evaluates characteristics of computer architecture to meet business objectives.*

- *The graduate analyzes computer architecture choices affecting information system solutions in order to effectively communicate and apply design considerations within an organization.*

- *The graduate analyzes the purpose and function of the operating system and how it interacts with the computer architecture.*

- *The graduate assesses the impacts of hardware and software design choices (i.e., cost, performance, optimization techniques, power consumption, size, compatibility, etc.) to improve quality and capabilities.*

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 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 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.*
- *The graduate decides on an efficient algorithm for developing usable software.*

Data Structures and Algorithms II

Data Structures and Algorithms II explores the analysis and implementation of high-performance data structures and supporting algorithms, including graphs, hashing, self-adjusting data structures, set representations, and dynamic programming. The course also introduces students to NP-complete problems. The course discusses how to use Python techniques to implement software solutions for problems of memory management and data compression. This course has two prerequisites: Data Structures and Algorithms I and Discrete Math II.

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 creates software applications that incorporate non-linear data structures for efficient and maintainable software.*
- *The graduate writes code using hashing techniques within an application to perform searching operations.*
- *The graduate incorporates dictionaries and sets in order to organize data into key-value pairs.*
- *The graduate evaluates the space and time complexity of self-adjusting data structures using big-O notation to improve the performance of applications.*
- *The graduate writes code using self-adjusting heuristics to improve the performance of applications.*
- *The graduate evaluates computational complexity theories in order to apply models to specific scenarios.*

Introduction to Artificial Intelligence

Introduction to Artificial Intelligence explores the foundational principles and practices of artificial intelligence (AI), machine learning, and robotics. The course prepares students to analyze relationships, build agents, and create models relevant to AI problems. The prerequisites for this course are Introduction to Probability and Statistics as well as Data Structures and Algorithms II.

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 analyzes the relationships and rules pertaining to intelligence within systems.*
- *The graduate writes code to enable robots to execute simple tasks.*
- *The graduate creates models with machine learning algorithms in order to extract actionable insights from data.*
- *The graduate distinguishes among search strategies to fit specific data-oriented problems.*
- *The graduate implements basic intelligent agent technology in order to automate services.*

Computer Science Capstone

The Computer Science Capstone course allows the student to demonstrate their application of the academic and professional abilities developed during the BSCS program. The capstone challenges students to integrate skills and knowledge from all program domains into one project.

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:

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

- *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 writes code that implements decision and loop constructs to control the flow of a program.*

- *The graduate creates arrays in order to solve complex problems.*

- *The graduate applies pointers to solve complex problems.*

- *The graduate writes code that creates and manipulates functions and files.*

- *The graduate applies object-oriented programming concepts in order to create a basic application.*

Software I

Software I builds object-oriented programming expertise and introduces powerful new tools for Java application development. You will learn about and put into action class design, exception handling, and other object-oriented principles and constructs to develop software that meets business requirements. This course requires foundational knowledge of object-oriented programming and the Java language.

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 designs software solutions with appropriate classes, objects, methods, and interfaces to achieve specific goals.*

- *The graduate implements object-oriented design principles (e.g., inheritance, encapsulation, and abstraction) in developing applications for ensuring the application's scalability.*

- *The graduate produces applications using high-level programming language constructs to meet business requirements.*

- *The graduate incorporates simple exception handling in application development for improving user experience and application stability.*

- *The graduate develops user interfaces to meet project requirements.*

Software II - Advanced Java Concepts

Software II - Advanced Java Concepts refines object-oriented programming expertise and builds database and file server application development skills. You will learn about and put into action lambda expressions, collections, input/output, advanced error handling, and the newest features of Java 8 to develop software that meets business requirements. This course requires intermediate expertise in object-oriented programming and the Java language.

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 produces database and file server applications using advanced constructs in a high-level programming language to meet business requirements.*

- *The graduate incorporates lambda expressions in application development to meet business requirements more efficiently.*

- *The graduate incorporates streams and filters in application development to manipulate data more efficiently.*

- *The graduate applies the localization API and date/time API in application development to support end-users in various geographical regions.*

- *The graduate incorporates advanced exception control mechanisms in application development for improving user experience and application stability.*

Software Engineering

This course introduces the concepts of software engineering to students who have completed the core courses in programming and project management. The principles build on previously acquired concepts, switching the emphasis from programming simple routines to engineering robust and scalable software solutions. This course does not cover programming, but provides an overview of software engineering processes and their challenging nature, focusing on the need for a disciplined approach to software engineering. A generic process framework provides the groundwork for formal process models. Prescriptive process models such as the waterfall model and agile development are included. An introduction to the elements and phases of software engineering is included, which explores requirements for engineering, design concepts, and software quality.

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 software engineering core principles, the generic process framework, and introductory software engineering concepts to a software project.*

- *The graduate recommends a software engineering process model for a project.*

- *The graduate interprets requirements refined through the software engineering process.*

- *The graduate designs requirements-based software solutions using software engineering design concepts and patterns.*

- *The graduate integrates software quality testing and assurance throughout the software development process.*

Software Quality Assurance

Software Quality Assurance applies a QA focus to every phase of the software development life cycle. This course investigates best practices for quality analysis, quality planning, and testing strategies as they pertain to the everyday practice of software development. Students will come to understand how their work fits into the bigger picture: how QA, testing, and code-writing practices interact within specific process models; the potential impact of new code on existing code or on other applications; the importance of usability, and the influence users have on the ultimate success of an application. Students will explore test plans, test cases, unit tests, integration tests, regression tests, usability tests, and test and review tools.

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 integrates quality best practices throughout the software development life cycle to improve the quality of code.*

- *The graduate recognizes the impact of different types of tests on the software development process in the context of quality-centered software development.*

- *The graduate uses test and review tools to uncover flaws or weaknesses in code.*

- *The graduate conducts unit tests to validate code.*

Data Management

Data Management - Foundations

This course introduces students to the concepts and terminology used in the field of data management. Students 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:

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

- *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 implements SQL concepts and coding.*

- *The graduate demonstrates an understanding of the concepts involved in the modeling of data.*

- *The graduate demonstrates appropriate strategies to normalize data.*

- *The graduate interprets the concepts of analytical processing within the context of business intelligence.*

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 students 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:

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

- *The graduate creates conceptual data models and translates them into physical schemas.*

- *The graduate creates databases utilizing SQL Data Definition Language (DDL) in MySQL environment.*

- *The graduate writes code to create and modify tables and views employing 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.*

- *The graduate populates tables with insert, update, and delete using DML 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.*

Advanced Data Management

Advanced Data Management enables organizations to extract and analyze raw data. Skillful data management allows organizations to discover and explore data in ways that uncover trends, issues, and their root causes. In turn, businesses are better equipped to capitalize on opportunities and more accurately plan for the future. As organizations continue to extract larger and more detailed volumes of data, the need is rapidly growing for IT professionals possessing data management skills. These skills include performing advanced relational data modeling as well as designing data marts, lakes, and warehouses. This course will empower software developers with the skills to build business logic at the database layer to employ more stability and higher data-processing speeds. Data analysts will gain the ability to automate common tasks to summarize and integrate data as they prepare it for analysis. Data Management 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 graduate writes complex SQL statements in order to implement functions, stored procedures, and triggers to prepare data sets for data analysis and manipulation.*

- *The graduate configures data extraction, transformation, and loading tasks in order to automate data integration.*

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:

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

- *The graduate applies key project management processes to guide business initiatives.*

- *The graduate determines the impact of project constraints and influences to manage risk.*

- *The graduate applies communication methods and change control processes to maintain clarity of project plans, activities, and changes for stakeholders.*

- *The graduate determines project tools and documentation methods to measure and monitor project performance.*

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:

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

- *The graduate understands the key concepts of service management.*

- *The graduate understands how the ITIL guiding principles can help an organization adopt and adapt service management.*

- *The graduate understands the four dimensions of service management.*

- *The graduate understands the purpose and components of the ITIL service value system.*

- *The graduate understands the activities of the service value chain, and how they interconnect.*

- *The graduate recognizes the purpose and key terms of 15 ITIL practices.*

- *The graduate understands 7 key ITIL practices.*

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 graduate selects appropriate influential leadership strategies to effectively navigate workplace situations.*

- *The graduate communicates ideas, opinions, and information suitable for various professional settings.*

- *The graduate reflects on the emotional reactions of self and others in a variety of professional situations.*

- *The graduate recommends strategies for decision-making in various team environments.*

Secure Systems Analysis & Design

Fundamentals of Information Security

This course lays the foundation for understanding terminology, principles, processes, and best practices of information security at local and global levels. It further provides an overview of basic security vulnerabilities and countermeasures for protecting information assets through planning and administrative controls within an organization.

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 defines security principles and cyber defense concepts to support security practices within an organization.*

- *The graduate identifies how security principles and cyber defense concepts impact organizational policies and practices.*

- *The graduate identifies security principles and cyber defense concepts that have been violated in common security failures.*

- *The graduate identifies security principles and cyber defense concepts to protect an organization's assets.*

- *The graduate identifies how confidentiality, integrity, and availability define security requirements for an organization.*

- *The graduate identifies guidelines in privacy and compliance as applied to cybersecurity.*

Operating Systems

Operating Systems for Programmers

This course covers operating systems from the perspective of a programmer including the placement of the operating system in the layered application development model. Primarily, OSs provide memory management, task scheduling, and CPU allocation. Secondarily, OSs provide tools for file storage/access, permission control, event handling, network access, and cross-process interaction. OSs also provide tools for debugging problems within a single process or within groups of programs.

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 describes operating systems, their functions, and their structure.*

- *The graduate describes processes and threads and their relationship to multithreading and parallel programming.*

- *The graduate explains the different approaches to memory management and how they affect CPU utilization.*

- *The graduate describes different file systems and I/O algorithms.*

- *The graduate describes mechanisms used by the operating system for protection and security and how they relate to software applications.*

Technical Communication

Technical Communication

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

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 integrates basic elements of professional discourse, including audience analysis, the writing process, correct grammar, and appropriate design elements, into technical communication artifacts.*

- *The graduate makes strategic and appropriate communication decisions based on the audience.*

- *The graduate creates various technically written artifacts using appropriate technical communication concepts.*

Accessibility and Accomodations

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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.

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