



Program Guidebook

Bachelor of Science, Software Engineering

Program Code: **BSSWE** Catalog Version: **202610** Published Date: **6/12/2026**

The Bachelor of Science in Software Engineering prepares students to design, build, and maintain modern software systems while developing strong problem-solving and leadership skills. The program emphasizes practical, project-based learning in areas such as programming, algorithms, cloud computing, and software design, while also covering essential topics like security, databases, and Agile development. Upon completion of the program, graduates are equipped to pursue careers as software engineers, designers, and developers.

Understanding the Competency-Based Approach

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

Progress through a degree program is measured not by the amount of time you spend in class but by your ability to demonstrate competency as you complete required courses along a Standard Path. To help you acquire the knowledge and skills you need to demonstrate competency and 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 your program's requirements and help you create a plan for completing your courses. You will also work closely with course instructors as you engage in each course. As subject matter experts, course instructors will guide you through the content you must learn to demonstrate competency through 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 you possess and can demonstrate—not the number of hours spent in a classroom.

Accreditation

Western Governors University is the only university in the history of American higher education to have earned initial accreditation from multiple regional accrediting commissions at once—earning simultaneous accreditation from ACCJC, HLC, NWCCU, and WASC. The university's accreditation from the Northwest Commission on Colleges and Universities (NWCCU) was reaffirmed in March of 2024. In addition to institution-level accreditation, each school has at least one program that is accredited by a programmatic accreditation. All programmatic accreditations are managed by the Academic Engagement department. Contact compliance@wgu.edu for additional information.

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.

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 will introduce you to the fundamentals of WGU’s competency-based education (CBE) and the expectations, policies, and protocols for students enrolled in a WGU degree program. Orientation will introduce you to WGU’s wide range of support resources and success centers. It also will provide you with study strategies recommended by current students and faculty that will help you succeed as a WGU student. Orientation ends with your first assessment at WGU, providing an opportunity to experience WGU’s performance assessment process before you begin your degree-focused coursework. 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. WGU undergraduate programs may accept transfer credits or apply a 'Requirement Satisfied' (RS) in some cases. Refer to your specific program transfer guidelines to determine what can be satisfied by previously earned college credits. Students entering graduate programs must have their undergraduate degree transcripts verified before being admitted to WGU. In addition to a program's standard course path, there may be additional state-specific requirements.

[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 must demonstrate your skills and knowledge by completing each course's assessment(s). You may be asked to demonstrate competency in a course in several different ways, including proctored exams, projects, essays, research papers, and simulations, among others. Certifications verified through third parties may also be included in your program as a way to demonstrate competency. More detailed information about each assessment is provided in the 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 Resource Fee. They can be accessed or enrolled for through your courses. Some degree-specific resources may not be 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 Student Handbook article provides additional details about the current state of mobile compatibility for learning resources at WGU.

[Mobile Access 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, Software Engineering

Course Title	CUs	Term
Introduction to Software Engineering	3	1
Mathematics for Programmers	3	1
Web Development Foundations	3	1
IT Leadership Foundations	3	1
Object Oriented Programming in Python	3	2
Version Control	1	2
JavaScript Programming	3	2
Applied Probability and Statistics	3	2
Introduction to Systems Thinking and Applications	3	2
Calculus I	4	3
Ethical Engineering	3	3
Data Management - Foundations	3	3
Foundations of UI/UX	4	3
Front End Development	3	4
Applied Discrete Mathematics	3	4
Composition: Successful Self-Expression	3	4
Network and Security - Foundations	3	4
Data Structures and Algorithms I	4	5

Linear Algebra for Engineers	3	5
Data for AI	3	5
General Physics I	3	5
Physics I Lab for Programmers	1	5
Health, Fitness, and Wellness	4	6
Java Frameworks	3	6
Agile for Software Engineering	3	6
General Chemistry I	3	6
Business of IT - Applications	4	7
Advanced Java	3	7
Operating Systems for Computer Scientists	3	7
AWS Developer	3	7
Introduction to Physical and Human Geography	3	8
Back-End Programming	3	8
Technical Communication	3	8
Software Security and Testing	3	8
Software Design and Quality Assurance	3	8
American Politics and the US Constitution	3	9

Special Topics in Software Engineering and AI	3	9
Software Engineering	4	9
Applied Software Engineering	4	9
Total CUs	120	

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, Software Engineering

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

Software

Introduction to Software Engineering

This course guides learners toward understanding what Software Engineering means, how it applies in the real world, and the landscape of careers in the field. It also includes a little review of programming while being appropriate for learners with little to no background in software engineering.

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 core programming principles, including variables, functions, and basic data structures to a given programming problem.*
- *The learner defines software engineering and its application to real-world problems.*

Foundations of UI/UX

This course introduces learners to the foundational principles of user interface (UI) and user experience (UX) design within software engineering contexts. Learners explore visual design principles, user-centered design methodologies, wireframing and prototyping techniques, usability testing, and design-development collaboration. The course emphasizes creating functional, accessible interfaces that meet both user needs and technical requirements. This course is appropriate for learners in software engineering programs who need practical UI/UX skills for front-end 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 learner applies foundations of UI/UX to software engineering contexts.*
- *The learner builds functional application wireframes and prototypes using common industry tools, techniques, and standards.*
- *The learner describes foundational principles of UI and UX.*
- *The learner iterates on application designs through formal and informal usability testing.*

Java Frameworks

Java Frameworks builds object-oriented programming expertise and introduces powerful new tools for Java application development. Students will execute exception handling, Java frameworks, and other object-oriented principles and constructs to develop a complete application including a user interface. 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 learner implements object-oriented programming frameworks.*
- *The learner implements user interfaces.*

Advanced Java

Advanced Java builds on object-oriented programming expertise by emphasizing multithreaded development and the use of Java frameworks to create scalable, maintainable applications. Learners will apply advanced Java techniques to design and implement software solutions that meet organizational and business requirements. The course also introduces deployment strategies using modern cloud services, enabling learners to deliver and manage applications in distributed environments. This course requires intermediate proficiency in Java and object-oriented programming.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner deploys software applications using cloud services.*
- *The learner describes basic algorithmic thinking and simple data structures, including the logic and outcomes of introductory algorithms in Python.*
- *The learner writes multithreaded, object-oriented code using Java frameworks.*

Back-End Programming

Back-End Programming introduces students to creating back-end components of a web application with the support of framework packages. This course also teaches students how to implement database functionality in a web application and how to create web services. 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 learner develops object-oriented applications that can be integrated with relational databases.*
- *The learner implements design patterns for object-oriented applications.*
- *The learner writes code for object-oriented applications using Spring framework.*

Software Security and Testing

This course prepares you to recognize security vulnerabilities in software, to plan interventions to address security vulnerabilities where they exist, and to develop and test these interventions. The course covers topics in Web security, permissions, and identity security; debugging; log file analysis; API security; and encryption and cryptography concepts.

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 security authentication for representational state transfer (REST) and application programming interfaces (APIs).*
- *The learner develops mitigation solutions for security vulnerabilities.*
- *The learner evaluates application and network logs for performance, availability, and security vulnerabilities.*

Software Design and Quality Assurance

Software Design and 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 learner defines plans for development tasks and environments based on desired quality outcomes.*
- *The learner determines the impact of business requirements on software design patterns and software systems.*
- *The learner identifies goals and potential roadblocks as part of software development plans.*
- *The learner recommends tools and services to address functional and non-functional testing outcomes.*

Special Topics in Software Engineering and AI

This course explores modern topics, challenges, and emerging solutions in software engineering and artificial intelligence. Students analyze contemporary frameworks, methodologies, and technologies, and apply them to solve real-world

problems. Through applied projects, learners design and develop software solutions, evaluate the use of emerging technologies, and assess technical, ethical, and professional implications. The course culminates in a completed application that demonstrates the ability to analyze, design, and implement a modern software solution.

This course covers the following competencies:

- The learner analyzes modern frameworks, methodologies, and technologies that expand on traditional software engineering practices.
- The learner designs software solutions to evolving industry needs using modern methods and tools.
- The learner examines the technical, ethical, and professional implications of special topics in software engineering in the context of modern software development.

Mathematics Content

Mathematics for Programmers

This course bridges mathematics and programming by using Python to develop mathematical reasoning skills. Students create and evaluate functions to model relationships, analyze and graph algebraic and trigonometric functions, and solve problems that build readiness for calculus and object-oriented programming while using computational tools to explore patterns, precision, and real-world applications.

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 algebraic and functional models using Python to analyze, graph, and solve calculus-preparatory problems.
- The learner develops Python functions to represent, evaluate, test, and explain mathematical relationships.
- The learner models trigonometric, geometric, and change-based relationships using Python to solve programming and calculus-preparatory problems.

Calculus I

Calculus I introduces the fundamental ideas of limits, derivatives, anti-derivatives, and basic differential equations as tools for modeling and solving real-world problems. Students explore how functions behave, how rates of change are measured and optimized, and how derivatives lead to applications in linear approximations and optimization. The basics of how accumulated quantities (antiderivatives) are computed using the Fundamental Theorem of Calculus are also introduced. Emphasis is placed on polynomial, exponential, logarithmic, and trigonometric functions, with applications drawn from science, engineering, economics, and technology. Students will focus on conceptual understanding, graphical interpretation, and applied problem-solving rather than formal proofs. By the end of the course, students will be able to analyze change, model systems, and apply calculus techniques to practical scenarios.

This course covers the following competencies:

- Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.
- The learner analyzes limits and continuity of functions to solve problems.
- The learner applies rules of differentiation to solve problems involving rates of change, linear approximation, and optimization.
- The learner evaluates definite and indefinite integrals using geometry and the Fundamental Theorem of Calculus.
- The learner solves separable differential equations and initial value problems.

Applied Discrete Mathematics

Applied Discrete Mathematics introduces the foundational mathematical structures that underpin modern technology. Topics include logic, Boolean algebra, sets, functions, relations, graphs, combinatorics, and modular arithmetic, with emphasis on their applications to technology concepts such as Boolean algebra and structures, password complexity, access control models, network topologies, and cryptography. Students will not focus on abstract proofs but will instead learn how discrete mathematics informs real-world technology structures and practices. By the end of the course, students will be able to apply mathematical reasoning to technology scenarios, analyze system vulnerabilities through discrete models, and explain the mathematical principles behind technological architectures and protocols.

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 real-world systems, including representations or models of mathematical structures.*
- *The learner applies logic and Boolean algebra principles to interpret and analyze real-world systems.*
- *The learner applies modular arithmetic and number theory concepts to describe aspects of real-world technological systems.*
- *The learner creates problem-solving models of real-world problems using combinatorics, probability, and graph theory.*

Web Development

Web Development Foundations

Welcome to Web Development Foundations! In this course you will learn about web design and development using HTML and CSS. This course employs the zyBooks learning platform which contains all the necessary reading materials, knowledge checks, and hands-on activities to prepare you for the course assessment. For the best understanding of the course content, complete each chapter. There are no prerequisites. Competency will be demonstrated with a performance assessment.

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.*
- *The learner implements web page formatting and interface aesthetics using CSS.*
- *The learner resolves software problems in web development environments with debugging tools.*

Business of IT

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 communicates ideas, opinions, and information suitable for various professional settings.*
- *The learner recommends strategies for decision-making in team environments.*
- *The learner reflects on the emotional reactions of self and others in a variety of professional situations.*
- *The learner selects appropriate influential leadership strategies for workplace situations.*

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.*

Programming

Object Oriented Programming in Python

This course bridges foundational programming skills to advanced object-oriented concepts, empowering learners to design and implement robust, scalable applications. It emphasizes the core pillars of object-oriented programming such as inheritance, composition, encapsulation, abstraction, and polymorphism while introducing data structure fundamentals. Learners will define and extend class hierarchies, apply method overriding, work with polymorphic collections, and traverse data structures using

iterative and recursive techniques. Through practical problem-solving, the course reinforces code reusability and equips learners to apply object-oriented principles for efficient, maintainable solutions.

This course covers the following competencies:

- The learner applies inheritance, encapsulation, and abstraction to programming problems with object-oriented code.
- The learner applies polymorphism and recursion to programming problems with object-oriented code.
- The learner develops code using inheritance in object-oriented programming.

JavaScript Programming

JavaScript Programming expands students' web development skill set by teaching them to build interactive, user-centered websites using JavaScript, cascading style sheets (CSS), the Document Object Model (DOM), and event handling. The course also introduces dynamic navigation, reactive interface components, and client-side data entry and storage. Web Development 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 develops reactive user web interfaces using CSS.
- The learner implements data entry and data storage capabilities in a web environment.
- The learner implements navigational schemes in web applications.
- The learner writes basic scripts to accomplish tasks with JavaScript.

Agile for Software Engineering

This course introduces the application of Agile methodology in software engineering, focusing on Scrum, Kanban, and collaborative team practices. Learners apply agile leadership frameworks, communication strategies, and agile processes to contribute effectively to software engineering projects and foster an agile team culture. Successful completion of this course may support learners in pursuing Agile or Scrum-related certifications offered by the Scrum Alliance.

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 a leadership framework to software engineering within an agile environment.
- The learner applies agile methodology to contribute to software engineering projects.
- The learner evaluates how agile leadership and processes improve the results and efficiency of software engineering processes.
- The learner implements effective collaboration and communication practices within agile software engineering teams.
- The learner strategizes how to foster an agile culture in software engineering contexts.

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.

General Education

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

Introduction to Systems Thinking and Applications

Introduction to Systems Thinking and Applications 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 analyzes complex problems and solutions using a systems thinking methodology.*
- *The learner applies the basic principles and foundational theory of systems thinking to a scenario.*
- *The learner designs a solution to a complex problem using systems thinking.*

Ethical Engineering

Ethical Engineering introduces learners to the ethical, professional, and societal responsibilities inherent in engineering practice. Learners examine the societal, economic, environmental, and global impacts of engineering decisions; interpret professional engineering codes of ethics; and apply ethical decision-making frameworks to real-world and historical engineering cases. Through case analysis and performance-based assessment, learners develop the judgment required to navigate ethical dilemmas in traditional and emerging engineering fields responsibly.

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 ethical decision-making frameworks to analyze and resolve ethical dilemmas in engineering contexts.*
- *The learner applies professional engineering codes of ethics to professional responsibilities in real-world and historical engineering cases.*
- *The learner evaluates the societal, economic, environmental, and global impacts of engineering decisions and technologies.*

Composition: Successful Self-Expression

Welcome to Composition: Successful Self-Expression! In this course, you will focus on four main topics: professional writing for a cross-cultural audience, narrowing research topics and questions, researching for content to support a topic, and

referencing research sources. 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. You will demonstrate competency through a performance assessment. There is no prerequisite for this course and there is no specific technical knowledge needed.

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 composes a written message with language appropriate for cross-cultural communication.*
- *The learner incorporates research to support a position or idea.*
- *The learner incorporates self-expression in written communication.*
- *The learner researches valid and reliable sources.*
- *The learner writes a message using an effective communication approach for a given situation.*
- *The learner writes a reference list.*
- *The learner writes in a professional manner for a given scenario.*

Health, Fitness, and Wellness

Health, Fitness, and Wellness focuses on the importance and foundations of good health and physical fitness, particularly for children and adolescents. This course addresses health, nutrition, and fitness, and substance use and abuse.

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 factors that influence mental, emotional, and social wellness.*
- *The graduate identifies the application of the core competencies of social and emotional learning.*
- *The graduate identifies the influence of disease, fitness, and lifestyle on the body.*
- *The graduate identifies the principles of nutrition and the components of a healthy diet.*

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 connections among the various factors contributing to climate change.*
- *The learner analyzes the message of a data visualization for a specific purpose.*
- *The learner analyzes the various causes and effects of human migration.*
- *The learner applies logical reasoning to the analysis of climate change.*
- *The learner interprets complex global systems through the lenses of physical and human geography.*

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 creates technical artifacts that are persuasive, informational, and research based.*
- *The learner delivers presentations with professional verbal communication skills and multimedia.*
- *The learner edits corporate communications for proper grammar and punctuation.*
- *The learner evaluates the impact of business etiquette and communication in digital environments.*

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 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 influence of the media, public opinion, and political discourse on American democracy.*
- *The graduate examines the struggle to balance individual liberty, public order, and state's rights.*
- *The graduate explains how the structure and powers of the United States government interact to form public policy.*

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 defines primary and foreign keys in data normalization.*
- *The learner determines how to run queries for creation and manipulation of data in relational databases.*
- *The learner explains attributes of databases, database tables, and structured and associated query language (SQL) commands.*

Software Development

Front End Development

This course develops learners' ability to analyze user and stakeholder requirements and design effective web-based solutions using existing frameworks, assets, and web content. Learners apply computing principles and contemporary tools to implement user-centered designs that emphasize usability, accessibility, and functional page layout from multiple user perspectives. The course further strengthens learners' skills in integrating application programming interfaces (APIs) and web services to add data-driven capabilities to web applications. Through applied design and implementation activities, learners demonstrate the ability to solve computing problems, evaluate design tradeoffs, and develop web solutions that meet specified functional and user requirements, consistent with professional computing practice.

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 adds data capabilities to web applications with application programming interfaces (APIs) and web services.*
- *The learner implements user-centered solutions from multiple perspectives emphasizing usability and functional page layouts.*

- The learner uses existing frameworks, assets, and web content that address stakeholder preferences and enhance website functionality.

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 applies network security concepts for business continuity, data access, and confidentiality.
- The learner identifies basic network systems and concepts related to networking technologies.
- The learner identifies solutions for compliance with security guidance.

Computer Science

Data Structures and Algorithms I

Data Structures and Algorithms I covers the fundamentals of dynamic data structures, such as bags, lists, stacks, queues, trees, and hash tables with their associated algorithms. This course discusses object-oriented design and abstract data types as design paradigms. 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 learner applies algorithms that address a desired outcome based on space and time complexity in big-O notation.
- The learner determines how data structure types impact operations within application, service, or data stores.
- The learner explains the use, logic, and structure of algorithms.

Operating Systems for Computer Scientists

Operating Systems for Computer Scientists focuses on the intricacies of operating systems. This comprehensive course for computer science students covers core principles such as processes, threads, memory management, and file systems, providing students with insights into CPU scheduling algorithms, deadlock handling, and system performance optimization. Additionally, the course delves into security mechanisms, addressing common threats and preventative measures. Through a blend of theoretical concepts and practical applications, students emerge equipped to adeptly navigate operating system features and prepared for real-world challenges in computer science.

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 different file systems and I/O algorithms.
- The learner describes mechanisms used by the operating system for protection and security and how they relate to software applications.
- The learner describes operating systems, their functions, and their structure.
- The learner describes processes and threads and their relationship to multithreading and parallel programming.
- The learner explains the different approaches to memory management and how they affect CPU utilization.

Mathematics

Linear Algebra for Engineers

This course develops foundational linear algebra knowledge and applies it to engineering and computing problems. Learners use matrix methods to formulate and solve systems of linear equations, analyze vector spaces and linear transformations to represent and manipulate multidimensional data, and determine eigenvalues, eigenvectors, and matrix factorizations to evaluate system behavior and optimize solutions. Emphasis is placed on applying mathematical principles to model, analyze, and solve real world problems, including applications in data representation, optimization, and the mathematical foundations of machine learning. The course builds on prior coursework in calculus for engineering and programming.

This course covers the following competencies:

- Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.
- The learner analyzes vector spaces, bases, and linear transformations to represent and manipulate multidimensional data.
- The learner applies matrix methods to model and solve systems of equations arising in engineering and computing.
- The learner determines eigenvalues, eigenvectors, and matrix factorizations to evaluate stability, optimize systems, and extract features.

Artificial Intelligence

Data for AI

This course examines data through a modern artificial intelligence (AI) lens, focusing on how data is sourced, prepared, and validated to support AI-driven systems. Learners explore the role of databases and data architectures in AI, including structured and unstructured data, and examine algorithms and techniques used to enable intelligent applications. Emphasis is placed on preparing, transforming, and validating data for use in AI systems. By the end of the course, learners will be able to support modern data-driven applications by applying data preparation, transformation, and testing techniques to ensure data quality and reliability for AI applications.

This course covers the following competencies:

- The learner applies data validation and testing techniques to trained data.
- The learner prepares data for AI systems.
- The learner supports modern data-driven applications using structured and unstructured data.
- The learner transforms data for use with AI applications.

General Science Content

General Physics I

This General Physics course covers fundamental concepts, including Newton's Laws, forces, motion, energy, waves, electricity, and magnetism, with real-world applications and insights into relativity and quantum theory. Learners will study measurement, forces and motion, Newton's Laws, centrifugal and centripetal forces, friction, gravity, momentum, collisions, vectors, wave motion, energy, thermodynamics, and electromagnetic waves. Skills developed include scientific literacy, physical science application, systems thinking, and scientific reasoning.

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 concepts of energy and entropy to describe systems.
- The learner applies concepts of physics to describe forces, motion, and momentum.
- The learner describes electricity, magnetism, and their relationship.

General Chemistry I

General Chemistry I introduces foundational principles of chemistry, starting at the atomic level and expanding to the behavior of elements within the periodic table. This course explores how atoms bond to form molecules and proceeds into chemical reactions, acids and bases, solutions, and nuclear reactions. Students will gain a comprehensive understanding of stability and change in chemical processes. This course highlights the practical aspects of chemistry, providing insights into how chemical principles underpin everyday phenomena and contribute to our understanding of environmental processes.

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 concepts of energy and entropy to describe systems.
- The learner describes processes and outputs of nuclear reactions.
- The learner recognizes patterns in the structure and properties of matter based on atomic structure.

Physics Content

Physics I Lab for Programmers

This course introduces foundational physics through programming-based lab experiences. Students apply the scientific method, analyze experimental data, and communicate results while modeling physical systems. Through applied projects, learners create

physics-based simulations and computational artifacts, building practical skills in scientific reasoning, data analysis, and technical communication.

This course covers the following competencies:

- *The learner conducts scientific investigations to answer questions using experimentation in the field of physics through a programming lens.*

Cloud and Virtualization

AWS Developer

AWS Developer examines the skills and knowledge needed to effectively implement automated and continuous testing processes for software deployments with cloud solutions. Students will learn to design software with Amazon Web Services (AWS), software development kits (SDKs), and command line interface (CLI), and to implement authentication, encryption, and authorization within an AWS environment. Students will also learn to design cloud service deployments with AWS infrastructure services, platform services, and features. Students will learn skills to monitor automated testing for quality control and to perform root cause analysis on testing or production failures. 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 designs cloud service deployments with Amazon Web Services (AWS) infrastructure services, platform services, and features.*
- *The learner designs software applications with Amazon Web Services (AWS), software development kits (SDKs), and command line interface (CLI).*
- *The learner implements authentication, encryption, and authorization within an Amazon Web Services (AWS) environment.*
- *The learner implements automated and continuous testing processes for software deployments with cloud solutions.*
- *The learner monitors automated testing for quality control.*
- *The learner performs root cause analysis on testing or production failures.*

Information Technology Management

Software Engineering

Software Engineering 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 it 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. This course also introduces the elements and phases of software engineering, including requirements engineering, design concepts, and software quality. 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 analyzes the objectives, scope, and organizational impact of software systems.*
- *The learner creates test cases for quality assurance as part of software development processes.*
- *The learner determines optimal software design for given requirements.*
- *The learner identifies the costs and impact of design changes to software systems.*

Software Applications

Applied Software Engineering

Applied Software Engineering demonstrates full-stack software solutions by producing comprehensive documentation and building functional applications that integrate front-end, back-end, and supporting services. It executes unit testing, revises software based on test outcomes, and documents all updates to ensure accuracy and quality. The course also deploys software applications to a cloud platform, using scripts and containers to deliver consistent, reliable performance across environments.

This course covers the following competencies:

- *The learner deploys software applications to a target environment and demonstrates that the application functions as*

intended.

- *The learner designs a software solution that addresses an identified need within defined requirements and constraints.*
- *The learner develops software solutions that meet defined requirements and demonstrate software engineering practices in implementation, testing, and documentation.*

Accessibility and Accommodations

Western Governors University (WGU) is committed to providing equal access to its academic programs to all qualified students. WGU's Student Disability Services department supports this mission by providing support, resources, advocacy, collaboration, and academic accommodations in accordance with federal and state statutes and regulations to WGU students and prospective students. Potential and current students needing to request accommodation(s) are encouraged to contact Student Disability Services to initiate the request. To initiate the accommodation process, all potential and current WGU students must complete the secure online Accommodation Request Form located at' https://www.wgu.edu/wgu/ada_form. Potential and current students can reach the Student Disability Services team Monday through Friday 8:00 a.m. to 5:00 p.m. MT at 1-877- 435-7948 x5922 or at sds@wgu.edu. Additional information on accommodations can be found in the student handbook Accommodations for Students with Disabilities policy.

Need More Information? WGU Student Services

Student Support Services team members also assist with unresolved concerns to find equitable resolutions. To contact the Student Support 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., and Saturday and Sunday, 10:00 a.m. to 7:00 p.m, mountain standard time.