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

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

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

Accreditation

Western Governors University is the only university in the history of American higher education to have

(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

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

Students vary widely in the specific skills and information they need to learn. For example, some students s in

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

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

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-

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 their degree pr8stG2dmar

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

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

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

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

 [Student Handbook article: Can I use my mobile device for learning resources?](#)

Standard Path

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

Standard Path *for* Bachelor of Science, Computer Science

Course Description	CUs	Term
Introduction to Computer Science	4	1
Applied Probability and Statistics	3	1
Scripting and Programming - Foundations	3	1
Data Management - Foundations	3	1
Network and Security - Foundations	3	2
Calculus I	4	2
Web Development Foundations	3	2
Data Management - Applications	4	2
Version Control	1	3
Practical Applications of Prompt	2	3
Scripting and Programming - Applications	4	3
Introduction to Systems Thinking and Applications	3	3
Discrete Mathematics I	4	3
Introduction to Communication: Connecting with Others	3	4
Computer Architecture	3	4
Natural Science Lab	2	4
Java Fundamentals	3	4
Discrete Mathematics II	4	4
Composition: Successful Self-Expression	3	5
American Politics and the US Constitution	3	5
Java Frameworks	3	5
Linux Foundations	3	5
Fundamentals of Information Security	3	5
Back-End Programming	3	6
Operating Systems for Computer Scientists	3	6
Advanced Java	3	6
Ethics in Technology	3	6
Data Structures and Algorithms I	4	6
Business of IT - Applications	4	7
Software Engineering	4	7
Health, Fitness, and Wellness	4	7
Data Structures and Algorithms II	4	7
Software Design and Quality Assurance	3	8
Introduction to AI for Computer Scientists	2	8
Artificial Intelligence Optimization for Computer Scientists	3	8

Course Description	CUs	Term
Advanced AI and ML	3	8
Computer Science Project Development with a Team	3	8

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

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, 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 explains the use, logic, and structure of algorithms.

The learner determines how data structure types impact operations within application, service, or data stores.

The learner applies algorithms that address a desired outcome based on space and time complexity in big-O notation.

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 AI for Computer Scientists

Introduction to AI for Computer Scientists provides an overview of critical terminology and key concepts for artificial intelligence (AI). The course explores the history and evolution of AI, elements of code, and the process for understanding algorithmic approaches to AI. The course presents topics of bias, ethical issues, and security concerns. Contextualized examples offer students an opportunity to see these concepts in professional scenarios; identifying issues within code,

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.

Introduction to Communication: Connecting with Others

Welcome to Introduction to Communication: Connecting with Others! It may seem like common knowledge that communication skills are important, and that communicating with others is inescapable in our everyday lives. While this may appear simplistic, the study of communication is actually complex, dynamic, and multifaceted. Strong communication skills are invaluable to strengthening a multitude of aspects of life. Specifically, this course will focus on communication in the professional setting, and present material from multiple vantage points, including communicating with others in a variety of contexts, across situations, and with diverse populations. Upon completion, you will have a deeper understanding of both your own and others' communication behaviors, and a toolbox of effective behaviors to enhance your experience in the workplace.

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 appropriate communication styles based on audience and setting.

The learner uses communication strategies for managing conflict.

The learner uses communication strategies to influence others.

Natural Science Lab

This course provides students an introduction to using the scientific method and engaging in scientific research to reach conclusions about the natural world. Students will design and carry out an experiment to investigate a hypothesis by gathering quantitative data. They will also research a specific ecosystem using academic sources and draw conclusions from their findings.

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 qa.647461 sph55l42p 0 rg78.9dxpddi82ence others.

Discre693l Science Lab

This course covers the following competencies:

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

Ethics in Technology

Ethics in Technology examines the ethical considerations of technology use in the 21st century and introduces students to a decision-making process informed by ethical frameworks. Students will study specific cases related to important topics such as surveillance, social media, hacking, data manipulation, plagiarism and piracy, artificial intelligence, responsible innovation, and the digital divide. This course has no prerequisites.

This course covers the following competencies:

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

The learner implements ethical decision-making frameworks in the information age.

The learner describes ethical issues regarding data privacy, accuracy, access, and security.

The learner explains professional ethical codes and their role in guiding professional behavior.

The learner identifies interventions for personal bias and related legal concerns.

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—addressing health, nutrition, 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 the influence of disease, fitness, and lifestyle on the body.

The graduate identifies the principles of nutrition and the components of a healthy diet.

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.

Scripting and Programming

Scripting and Programming - Foundations

Scripting and Programming - Foundations introduces programming basics such as variables, data types, flow control, and design concepts. The course is language-agnostic in nature, ending in a survey of languages, and introduces the distinction between interpreted and compiled languages. Learners will gain skills in identifying scripts for computer program requirements and in using fundamental programming elements as part of common computer programming tasks. Learners will also gain an understanding of the logic and outcome of simple algorithms.

This course covers the following competencies:

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

The learner identifies scripts for computer program requirements.

The learner uses fundamental programming elements as part of common computer programming tasks.

The learner explains the logic and outcome of simple algorithms.

Data Management

Data Management - Foundations

gain skills in creating databases and tables in SQL-enabled database management systems, as well as skills in normalizing databases. No prerequisites are required for this course

This course covers the following competencies:

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

The learner explains attributes of databases, database tables, and structured and associated query language (SQL) commands.

The learner determines how to run queries for creation and manipulation of data in relational databases.

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.

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.

Java Fundamentals

Java Fundamentals introduces you to object-oriented programming in the Java language. You will create and call methods, design Java classes, and other object-oriented principles and constructs to develop software that meets business requirements. This course requires foundational knowledge of programming including variables, type, program flow and debugging.

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 object-oriented programs.

The learner creates methods in Java.

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 user interfaces.

The learner implements object-oriented programming 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 writes code for object-oriented applications using Spring framework.

The learner implements design patterns for object-oriented applications.

Advanced Java

Advanced Java refines object-oriented programming expertise and skills. You will implement multithreaded, object-oriented code with the features of Java necessary to develop software that meets business requirements. Additionally, you will determine how to deploy software applications using cloud 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 writes multithreaded, object-oriented code using Java frameworks.

The learner determines how to deploy software applications using cloud services.

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 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 defines plans for development tasks and environments based on desired quality outcomes.

The learner recommends tools and services to address functional and non-functional testing outcomes.

Operating Systems

Linux Foundations

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

This course covers the following competencies:

Begin your course by discussing your course planning tool report with your instructor and creating your personalized

course plan together.

The learner identifies the fundamentals of open-source software.

The learner develops resources for data access and security.

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 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 identifies security principles, policies, practices, and methods for asset protection and cyber defense.

The learner identifies security requirements based on principles of confidentiality, integrity, and availability.

The learner identifies cybersecurity guidelines in privacy and compliance.

Information Technology Management

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 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.

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.

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 identifies the costs and impact of design changes to software systems.

The learner determines optimal software design for given requirements.

The learner creates test cases for quality assurance as part of software development processes.

Business of IT

Business of IT - Applications

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

This course covers the following competencies:

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

The learner applies Information Technology Infrastructure Library (ITIL) concepts, core components, principles, and models of service management.

The learner applies the Information Technology Infrastructure Library (ITIL) six activities of the service value chain.