



Program Guidebook

Bachelor of Science, Software Engineering (BSSWE to MSSWE)

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Students enrolled in the Accelerated Software Engineering Bachelor's and Master's Degree program will first complete the Bachelor of Science in Software Engineering portion of the program, and after completing the necessary bachelors and bridge course work, will receive the Bachelor of Science, Software Engineering degree. Students can then determine which masters specialization they would like to enroll in: Master of Science, Software Engineering, DevOps Engineering, Master of Science, Software Engineering, AI Engineering, or Master of Science, Software Engineering, Domain Driven Design. From there, students will then progress to the remaining graduate course work, and upon completion will receive the Master of Science, Software Engineering Management degree within their chosen specialization.

The Bachelor of Science in Software Engineering (SW) degree program provides a solid foundation in software engineering systems and technologies. In addition to the SW content, the degree program includes a broad collegiate-level education. The program is primarily designed for those seeking a career or to advance their current career as software engineering professionals by developing levels of expertise required for increased responsibility in the software engineering field. At the end of the program, students develop a comprehensive portfolio and complete a capstone project.

The Master of Science in Software Engineering is a competency-based degree program representing a path for successful software engineering professionals to launch their careers and build them to an executive level. The graduate will advance their knowledge and skills through a practical, real-world program based on sound principles of Software Engineering. This program revolves around the following primary themes: communication, technical competence, and strategic vision

Understanding the Competency-Based Approach

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

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

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

Accreditation

Western Governors University is the only university in the history of American higher education to have earned 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 will be required to demonstrate your skills and knowledge by completing the assessment(s) for each course. In general there are two types of assessments: performance assessments and objective assessments. Performance assessments contain, in most cases, multiple scored tasks such as projects, essays, and research papers. Objective assessments include multiple-choice items, multiple-selection items, matching, short answer, drag-and-drop, and point-and-click item types, as well as case study and video-based items. Certifications verified through third parties may also be included in your program. More detailed information about each assessment is provided in each course of study.

Learning Resources

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

Mobile Compatibility:

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

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

Standard Path

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

Standard Path *for* Bachelor of Science, Software Engineering (BSSWE to MSSWE)

Course Description	CUs	Term
Scripting and Programming - Foundations	3	1
Introduction to Programming in Python	3	1
IT Leadership Foundations	3	1
Web Development Foundations	3	1
Version Control	1	2
Front-End Web Development	3	2
Applied Probability and Statistics	3	2
Introduction to IT	4	2
Natural Science Lab	2	2
Applied Algebra	3	3
Data Structures and Algorithms I	4	3
Introduction to Systems Thinking	3	3
Data Management - Foundations	3	3
Data Management - Applications	4	4
JavaScript Programming	3	4
Ethics in Technology	3	4
Advanced Data Management	3	4

User Interface Design	3	5
User Experience Design	3	5
Java Fundamentals	3	5
Health, Fitness, and Wellness	4	5
Java Frameworks	3	6
Network Architecture and Cloud Computing	3	6
Hardware and Operating Systems Essentials	3	6
Business of IT - Project Management	4	6
Back-End Programming	3	7
Composition: Successful Self-Expression	3	7
Business of IT - Applications	4	7
Advanced Software Engineering	3	7
Introduction to Physical and Human Geography	3	8
Advanced Java	3	8
Software Security and Testing	3	8
Technical Communication	3	8
Software Architecture and Design	3	8
American Politics and the US Constitution	3	9

Software Quality Assurance and Deployment	4	9
Mobile Application Development (Android)	3	9
Software Engineering Capstone	4	9
Total CUs	119	

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 (BSSWE to MSSWE)

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.

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 explains the logic and outcome of simple algorithms.*
- *The learner identifies scripts for computer program requirements.*
- *The learner uses fundamental programming elements as part of common computer programming tasks.*

Introduction to Programming in Python

Introduction to Programming in Python introduces skills in creating Python scripts with basic programming concepts. Learners will be able to create control flow with functions and loops, and to implement code with packages, modules, and libraries.

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 control flow with functions and loops.*
- *The learner creates python scripts with basic programming concepts.*
- *The learner implements code with packages, modules, and libraries.*

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 - Project Management

In this course, students will build on industry standard concepts, techniques, and processes to develop a comprehensive foundation for project management activities. During a project's life cycle, students will develop the critical skills necessary to initiate, plan, execute, monitor, control, and close a project. Students will apply best practices in areas such

as scope management, resource allocation, project planning, project scheduling, quality control, risk management, performance measurement, and project reporting. This course prepares students for the following certification exam: CompTIA Project+.

This course covers the following competencies:

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

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.*

Web Development

Web Development Foundations

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

This course covers the following competencies:

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

Front-End Web Development

Front-End Web Development builds upon web design and development skills to teach students how to organize websites with navigational schemes and create reactive user web interfaces using cascading style sheets (CSS). In this course, students will implement data entry and data storage capabilities in a web design, as well as implement best practices in design, including user-centered design and usability. 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 websites.*
- *The learner implements user-centered solutions from multiple perspectives emphasizing usability and functional page layouts.*

User Interface Design

This course covers tools and techniques employed in user interface design, including web and mobile applications. Concepts of clarity, usability, and detectability are included in this course, as well as other design elements such as color schemes, typography, and layout. Techniques like wireframing, usability testing, and SEO optimization are also covered.

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 builds wireframes, mockups and prototypes for the user interface that address customer needs.*
- *The learner designs user interface that addresses user needs and functional requirements development efforts.*
- *The learner determines the purpose and technical requirements of webpages.*

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.*

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

Applied Algebra

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

This course covers the following competencies:

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

Introduction to Systems Thinking

Introduction to Systems Thinking provides learners with the skills required to engage in a holistic systems-based approach to analyzing complex problems and solutions. This course introduces the foundational concepts and principles of systems thinking and provides opportunities to use a systems thinking approach to analyze and evaluate real-world case studies. The course will culminate with using systems thinking to develop a solution to an authentic complex problem. This course has no prerequisites, but general education math (C955 or C957) is preferred. Because the course is self-paced, learners may move through the material as quickly or as slowly as needed, with the goal of demonstrating proficiency in the five competencies covered in the final assessment. If learners have no prior knowledge of this material, they can expect to spend 30 to 40 hours on the course content.

This course covers the following competencies:

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

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

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 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.*

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.*

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.*

IT Fundamentals

Introduction to IT

Introduction to IT examines information technology as a discipline and the various roles and functions of the IT department as business support. Students are presented with various IT disciplines, including systems and services, network and security, scripting and programming, data management, and business of IT, with a survey of technologies in every area and how they relate to each other and to the business.

This course covers the following competencies:

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

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.*

Software Engineering Capstone

The capstone challenges students to integrate skills and knowledge from all program domains into one project.

This course covers the following competencies:

- *The learner deploys software applications with scripts and containers on a cloud platform.*
- *The learner develops full stack software engineering documentation and applications.*
- *The learner executes documentation, unit testing, and revision of software applications.*

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.*

Data Management - Applications

Data Management - Applications covers conceptual data modeling and introduces MySQL. Students will learn how to create simple to complex SELECT queries, including subqueries and joins, and how to use SQL to update and delete data. Topics covered in this course include exposure to MySQL; creating and modifying databases, tables, views, foreign keys and primary keys (FKs and PKs), and indexes; populating tables; and developing simple Select-From-Where (SFW) queries to complex 3+ table join queries. The following course is a prerequisite: Data Management - Foundations.

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 DML statements that insert, update, and delete data in data tables.*
- *The learner implements joins and aggregate functions in SQL queries.*
- *The learner queries database tables and views with SQL code.*
- *The learner recommends databases and database management systems to meet organizational needs.*

Advanced Data Management

Advanced Data Management enables learners to extract and analyze raw data. Skillful data management allows organizations to discover and explore data in ways that uncover trends, issues, and their root causes. In turn, businesses are better equipped to capitalize on opportunities and more accurately plan for the future. As organizations continue to extract larger and more detailed volumes of data, the need is rapidly growing for IT professionals who possess data management skills. The skills gained in this course include performing advanced relational data modeling as well as designing data marts, lakes, and warehouses. This course will empower learners with the skills to build business logic at the database layer to employ more stability and higher data-processing speeds. Learners will gain the ability to automate common tasks to summarize and integrate data as they prepare it for analysis. Data Management - Foundations is a prerequisite for this course.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner configures data extraction, transformation, and loading tasks for automated data integration.*
- *The learner writes complex Structured Query Language (SQL) statements for data analysis and manipulation.*

Software Development

JavaScript Programming

JavaScript Programming introduces students to programming with JavaScript, including how to use JavaScript to enhance a website. This course covers how to use existing frameworks, assets, and web content to enhance website functionality, as well as how to use application programming interfaces (APIs) and web services to add data capabilities to web 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 adds data capabilities to web applications with application programming interfaces (APIs) and web services.*
- *The learner uses existing frameworks, assets, and web content that address stakeholder preferences and enhance website functionality.*
- *The learner writes basic scripts to accomplish tasks with JavaScript.*

Software

User Experience Design

User Experience Design explores multiple tools and techniques used in user experience design. Students are presented with an in-depth view of activities involved in the design of user experience and have the opportunity to create several deliverables including persona profiles, information architectures, and prototypes of different levels of fidelity. In addition, the course also covers usability testing and the evaluation of quantitative and qualitative data derived from these and other experiments.

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 conducts formal and informal usability testing as part of application design prototyping.*
- *The learner designs application wireframes and prototypes using industry standard tools and techniques.*
- *The learner establishes timeframes for user experience projects based on business requirements.*
- *The learner updates application designs based on user testing analysis results.*

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 methods in Java.*
- *The learner creates object-oriented programs.*

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.*

Network Architecture and Cloud Computing

In this course, students are equipped to understand, analyze, and implement cloud computing solutions tailored to diverse business needs. The curriculum offers an in-depth look at state-of-the-art cloud technologies, the underlying business trends fueling cloud adoption, and the foundational systems of modern data center computing. Participants will learn to identify and apply various cloud systems to specific business cases, understand the interplay between network systems to form cloud computing environments, and utilize cloud computing models to address infrastructure challenges. A focus on network security enables learners to assess and enhance network security systems, covering cybersecurity principles, perimeter security, authentication, and the creation of secure networks. The course also delves into scalable distributed systems and programming frameworks that facilitate edge computing, illustrating how cloud-based solutions can resolve real-world business 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 learner analyzes network and cloud computing models and how they will be used to solve infrastructure problems.*
- *The learner describes how the network systems interact and connect to create cloud computing environments.*
- *The learner develops a cloud-based solution to a business problem.*
- *The learner evaluates a system for network security to suggest improvements.*
- *The learner explains the different cloud systems for different general business cases.*

Hardware and Operating Systems Essentials

Hardware and Operating Systems prepares learners for concepts in software engineering by providing a foundation of understanding in computer architecture, the history of computing architectures, and operating systems. Additional topics covered include hardware and software stacks and how to choose appropriate hardware and software solutions to meet both functional and non-functional business requirements.

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 topologies for hardware and software solutions that address both functional and non-functional requirements of business solutions.*
- *The learner explains design decisions based on the history and foundations of technology stacks.*
- *The learner explains the configuration and deployment of software applications.*

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.*

Advanced Software Engineering

Advanced Software Engineering delves into the intricate processes and methodologies essential for developing sophisticated, scalable software architectures. This course offers an in-depth exploration of the software engineering lifecycle, emphasizing a disciplined approach to navigating the complex challenges of software engineering. Students will explore

advanced process frameworks and methodologies, including the Waterfall Model and Agile Development, tailored to large-scale and high-stakes projects.

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 demonstrates project management skills through communication, collaboration, problem-solving, setting project goals and managing expectations.*
- *The learner describes how the development of a project will be monitored using key metrics.*
- *The learner explains each phase of a software development life cycle.*
- *The learner justifies the methodology selected based on a project's scope, complexity, timeline, budget, risks, and expectations.*

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 determines how to deploy software applications using cloud services.*
- *The learner writes multithreaded, object-oriented code using Java frameworks.*

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 Architecture and Design

This course covers topics in designing, analyzing, and managing large-scale software systems. Students will learn various architecture types, how to select and implement appropriate design patterns, and how to build well-structured, reliable, and secure software systems.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner analyzes the different design patterns that relate to software elements in a software system.*
- *The learner explains which design patterns should be used to address software problems.*
- *The learner implements a software architecture and design solution to solve a real-world problem.*
- *The learner justifies the software architecture used in a software system*

Software Quality Assurance and Deployment

This course equips students with the skills and knowledge necessary for ensuring high-quality software development and effective deployment practices. The curriculum covers quality models and metrics, QA methods, automated testing, and the

design and implementation of test cases. This course introduces students to continuous integration/continuous deployment (CI/CD) pipelines and tools, performance testing, and the tools required for assessing software performance. Students will also learn about deployment strategies, rollback procedures, disaster recovery plans, and monitoring and logging practices, each crucial for the software's operational integrity in production environments.

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 a disaster recovery plan that will enable a business to quickly resume after an unplanned incident.*
- *The learner creates an outline of a deployment strategy.*
- *The learner documents the objectives and requirements for automated testing through case studies.*
- *The learner evaluates and selects deployment strategies based on the specific characteristics of the infrastructure environment.*
- *The learner identifies the quality model and metrics to use to ensure the software meets the needs and expectations of the business.*

Mobile Application Development (Android)

Mobile Application Development introduces students to programming for mobile devices using a software development kit (SDK). Students with previous knowledge of programming will learn how to install and use an SDK, build a basic mobile application, build a mobile application using a graphical user interface (GUI), adapt applications to different mobile devices, save data, execute and debug mobile applications using emulators, and deploy a mobile application.

This course covers the following competencies:

- *Begin your course by discussing your course planning tool report with your instructor and creating your personalized course plan together.*
- *The learner articulates challenges in the development process.*
- *The learner creates page layouts with clean navigation.*
- *The learner describes alternative methods in overcoming mobile application development problems.*
- *The learner designs mobile application infrastructure and user interfaces.*
- *The learner develops secure database-backed mobile applications in an object-oriented language.*
- *The learner documents solutions for application requirements with storyboards and emulators.*

Accessibility and Accommodations

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