



Program Information

Degree description

The Software Development degree from BYU-Idaho prepares students with the programming and development skills they need for a career in software development with particular emphasis in Web development.

Program outcomes

1. Develop software to accomplish meaningful tasks in a variety of domains and in a variety of languages and platforms.
2. Develop dynamic, data-driven applications that are visually appealing and follow industry standards.
3. Contribute to various phases of the software lifecycle including planning, design, development, and testing.
4. Systematically evaluate the pros and cons of alternative solutions.
5. Independently learn and apply new technologies, languages, and platforms.
6. Demonstrate the traits of an effective team member.
7. Demonstrate effective skills related to getting a job as a software developer.

Potential employment

- Successful students will be prepared for positions in software or web development.

Required certificates (details on next page)

- 1st Certificate: Web and Computer Programming
- 2nd Certificate: Web Development
- 3rd Certificate: Software Development

Required Course List

PathwayConnect Certificate*

- PC 101 Life Skills
- PC 102 Professional Skills
- PC 103 University Skills

Web and Computer Programming Certificate

- CSE 110 Introduction to Programming
- CSE 111 Programming with Functions
- CSE 210 Programming with Classes
- WDD 130 Web Fundamentals
- WDD 131 Dynamic Web Fundamentals
- WDD 231 Web Frontend Development 1



2024 Catalog

Software Development Bachelor's Degree (BYU-Idaho)

Web Development Certificate

- ITM 111 Introduction to Databases
- CSE 340 Web Backend Development
- CSE 341 Web Services
- WDD 330 Web Frontend Development 2
- WDD 430 Web Full-Stack Development

Software Development Certificate

- CSE 212 Programming with Data Structures
- CSE 270 Software Testing
- CSE 300 Professional Readiness
- CSE 310 Applied Programming
- CSE 325 .NET Software Development
- CSE 370 Software Engineering Principles

Additional Required Courses

- GS 170 Career Development
- BUS 321 Organizational Leadership
- CSE 499 Senior Project

General Education Courses

- WRIT 101 Writing in Professional Contexts
- MATH 108X Math for the Real World
- BUS 301 Advanced Writing in Professional Contexts
- REL 250C Jesus Christ and His Everlasting Gospel
- REL 275 Teachings and Doctrine of the Book of Mormon
- REL 200 The Eternal Family
- REL 225 Foundations of the Restoration
- REL 333 Teachings of the Living Prophets (or other religion elective course)
- REL 324 The Doctrine and Covenants — Part One (or other religion elective course)
- REL 325 The Doctrine and Covenants — Part Two (or other religion elective course)
- FCS 160 Family Leadership and Resource Management
- GESCI 110 Sustaining Human Life
- HUM 110 Discovery and Discernment Through the Arts
- PUBH 132 Personal Health and Wellness
- PEACE 101 Conflict and Peace

*Direct admit students complete alternative courses instead of PathwayConnect (GE 103: Online University Skills, COMM 150: Interpersonal Theory and Practice, and FCS 340: Money Management).



Course Details

PathwayConnect Certificate

1. PC 101: Life Skills (3 credits)

- Develop essential life skills, such as goal setting and problem solving.
- Develop writing ability in organization, clarity, and audience awareness.
- Learn and apply basic math skills to everyday situations.

2. PC 102: Professional Skills (3 credits)

- Develop necessary skills to advance career.
- Produce clear and professional writing.
- Learn to use data and math to make decisions.

3. PC 103: University Skills (1 credit)

- Create and follow an academic plan to a bachelor's degree.
- Demonstrate an understanding of local and online resources for online student success.

Web and Computer Programming Certificate:

4. CSE 110 Introduction to Programming (2 credits)

- Use programming building blocks (variables, conditionals, loops, lists) to accomplish meaningful tasks in a variety of domains.
- Develop confidence in learning new programming skills.

5. CSE 111 Programming with Functions (2 credit)

- Write and call functions in programs to accomplish meaningful tasks in a variety of domains.
- Research and call functions written by others.
- Write programs that can detect and recover from invalid conditions.
- Use objects and libraries written by others.
- Follow good practices in designing, writing, and debugging functions.

6. CSE 210 Programming with Classes (2 credits)

- Articulate the principles of programming with classes.
- Design software using the principles of programming with classes.
- Develop working software using the techniques of programming with classes.

7. WDD 130 Web Fundamentals (2 credits)

- Demonstrate basic proficiency in using current, valid, and semantic Hypertext Markup Language (HTML) syntax to define the structure and content of a webpage.
- Demonstrate basic proficiency in using current valid Cascading Style Sheets (CSS) to style an HTML document.
- Plan, design, and develop web pages and sites according to best practices of organization and maintainability.
- Discover and analyze the web design and development industry as a career path.
- Work effectively with others by communicating clearly, collaborating as a team member, fulfilling assignments, and meeting deadlines.

8. WDD 131 Dynamic Web Fundamentals (2 credits)

- Develop responsive web pages that follow best practices and use valid HTML and CSS.
- Demonstrate proficiency with JavaScript language syntax.
- Use JavaScript to respond to events and dynamically modify HTML.
- Demonstrate the traits of an effective team member (such as clear communication, collaboration, fulfilling assignments, and meeting deadlines).

9. WDD 231 Web Frontend Development 1 (2 credits)

- Develop dynamic websites that use valid HTML and CSS that follow best practices of accessibility and compliance.
- Create dynamic web sites that leverage browser APIs, JSON, and remote APIs.
- Use industry tools to monitor performance and to optimize the user experience.
- Demonstrate the traits of an effective team member (such as clear communication, collaboration, fulfilling assignments, and meeting deadlines).

Web Development Certificate:

10. ITM 111 Introduction to Databases (3 credits)

- Explain how data and databases are used in business systems.
- Demonstrate the design and creation of relational databases.
- Use a DBMS (Database Management System) and CASE (Computer-Aided Software Engineering) tool.
- Construct Create, Insert, Update, and Delete statements.
- Query a database using single and multiple tables, including built-in aggregate functions and WHERE clause filtering.

11. CSE 340 Web Backend Development (3 credits)

- Develop to current web frontend standards of validity and practice.
- Use variables, arrays, functions, and control structures in server code.
- Develop web applications that implement common design patterns.
- Design and use relational databases for CRUD interactions.
- Validate data (client-side and server-side) appropriate to the task.
- Demonstrate the skills of a productive team member (such as solving problems, collaborating with others, communicating clearly, fulfilling assignments, and meeting deadlines.)

12. CSE 341 Web Services (3 credits)

- Understand the difference between server-side rendering and REST APIs and how to implement them.
- Incorporate a secure authentication system in a web application that traverses the full stack.
- Deploy a full stack application to the web.
- Develop, document, and deploy a secure REST API that performs CRUD operations on a NoSQL database.
- Effectively contribute to a team while learning independently.

13. WDD 330 Web Frontend Development 2 (3 credits)

- Become more efficient at applying your innate curiosity and creativity.
- Become more dexterous at exploring your environment.
- Become a person who enjoys helping and learning from others.
- Use a divide and conquer approach to design solutions for programming problems.
- Finding and troubleshooting bugs you and others will have in the code you write.
- Developing and debugging HTML, CSS, and JavaScript programs that use medium complexity web technologies.

14. WDD 430 Web Full-Stack Development (3 credits)

- Demonstrate the use of advanced JavaScript concepts.
- Design web based applications using the MEAN web development stack: MongoDB, Express, AngularJS, and Node.js.
- Design and develop NoSQL databases using good design principles.
- Develop a web based application that uses a JavaScript framework on the front end, and a Node.js application server on the back end connected to a NoSQL database. The application will allow the end user to insert new data, update existing data, delete data and return data stored in the NoSQL database.
- Work effectively in teams and demonstrate good communication skills.

Software Development Certificate:**15. CSE 212 Programming with Data Structures (2 credits)**

- Apply a systematic approach to writing code to solve problems involving data structures.
- Evaluate the performance of alternative solutions for code containing data structures using big O notation.
- Predict the purpose and behavior of existing code containing data structures.
- Discover defects using testing in code containing data structures.
- Articulate the answers to technical questions involving data structures.
- Solve problems using data structures independently.

16. CSE 270 Software Testing (3 credits)

- Classify (list, define, and explain) the software testing concepts, tools, and processes.
- Appraise and assess software testing tools and techniques to address the needs of a given scenario.
- Prepare and implement a test plan.
- Work with a partner and in small teams to achieve a shared goal.
- Learn information from a wide variety of professional sources.

17. CSE 300 Professional Readiness (1 credit)

- Develop effective skills relating to building professional connections, confidence, and employability.

18. CSE 310 Applied Programming (3 credits)

- Independently research and create computing solutions in a variety of languages and domains.
- Contribute and interact with peers to successfully develop software.

19. CSE 325 .NET Software Development (3 credits)

- Define the role of the .NET Framework and the Microsoft Visual Studio Integrated Development Environment in the development industry.
- Develop a working competency of the C# language using common control structures and object-oriented principles.
- Demonstrate a working competency in using the MS Visual Studio platform developing applications with C#.
- Plan, design, and develop windows given functional and developmental specifications.
- Plan, design, and develop dynamic web content using ASP.NET with the Razor syntax and core web technologies (HTML, CSS, JavaScript).
- Leverage the power of the Model-View-Controller design pattern and plan, design, and develop ASP.NET MVC web applications.
- Categorize and utilize the .NET frameworks, technologies and add-ons.
- Analyze, design, develop, and test a web-based application using ASP.NET with C# in a small team environment.

20. CSE 370 Software Engineering Principles (2 credit)

- Describe each phase of a software development project.
- Compare and contrast software lifecycle models.
- Analyze software projects at various phases.

Additional Required Courses**21. GS 170 Career Development (1 credits)**

- Communicate personal and essential employable skills matched to a target job.
- Create a list of employers, contacts and opportunities to obtain or improve employment.
- Prepare effective professional documents and digital profile that incorporate essential employability skills.
- Identify and practice effective networking and job-search strategies.
- Connect and network with professionals, mentors and potential employers in student's target industry.
- Apply for jobs and/or improved position in current organization.
- Demonstrate effective interviewing and post-interviewing skills.

22. BUS 321 Organizational Leadership (3 credits)

- Demonstrate proficient application of individual effectiveness principles and skills.
- Use organizational and team leadership principles to analyze and propose solutions to real-world problems.
- Practice and apply principles and skills of effective interpersonal and team communication.
- Apply each principle and skill in the contexts of work, home, church, and community.

23. CSE 499 Senior Project (3 credits)

- Apply "learn how to learn" to understand a new topic.
- Deliver proposal, requirement specification, design document, and development plan for a significant project.
- Integrate previously learned material and apply it into a new area of computer science.
- Complete a significant project using software engineering principles.
- Present results of project in a professional forum.

General Education Courses**24. WRIT 101: Writing in Professional Contexts**

- Produce personal writing, and accurately and honestly cite the contributions of others.
- Practice the writing process, including research, drafting, peer review, and revision.
- Apply language conventions required for effective reading and writing, including word choice, sentence structure, paragraph structure, and overall organization.
- Adapt writing to a variety of rhetorical situations.

25. MATH 108X: Math for the Real World

- Identify real-world situations (e.g. financial, family, social, or community issues) where quantitative reasoning skills are needed to inform a decision.
- List key assumptions and key variables necessary to apply mathematical models of real-world situations.
- Demonstrate the quantitative skills necessary to use mathematical models.
- Use mathematical models to make an informed decision.
- Evaluate decisions made with the Quantitative Reasoning Process.

26. BUS 301: Advanced Writing in Professional Contexts

- Understand how to craft writing to fit the needs of various audiences.
- Apply critical thinking skills to the writing process.
- Gain fundamental skills in composition, editing, and rhetoric.
- Demonstrate coherent, clear, and cogent business writing in a variety of genres.
- Produce quality writing, and explain what makes it effective.

27. REL 250C: Jesus Christ and His Everlasting Gospel

- Demonstrate the ability to follow Jesus Christ along Heavenly Father's covenant path to eternal life.
- Describe the divine roles of Jesus Christ in the everlasting gospel.
- Define the new and everlasting covenant.

28. REL 275: Teachings and Doctrine of the Book of Mormon

- Identify several "great things" the Lord has done for His children.
- Explain how the covenants of the Lord with the House of Israel make it so "they are not cast off forever."
- Teach why Jesus is the Christ, the Eternal God.
- Understand how to apply the doctrine of Christ to "be found spotless at the judgment seat of Christ."

29. REL 200: The Eternal Family

- Learn doctrines and principles taught within “The Family: A Proclamation to the World,” such as the eternal nature of marriage and family; the doctrine of gender; the divine roles of men and women; the laws governing chastity and physical intimacy in marriage; and principles governing happiness in family life.
- Demonstrate understanding of and apply the doctrines and principles taught in “The Family: A Proclamation to the World.”
- Demonstrate the ability to teach and share with others across a range of topics associated with the doctrines and principles found in “The Family: A Proclamation to the World.”
- Show the ability to problem-solve challenges that result from violations of doctrines and principles found in “The Family: A Proclamation to the World.”

30. REL 225: Foundations of the Restoration

- Identify and understand foundational revelations and doctrine relating to the ongoing Restoration, and know key people and historical events related to each.
- Develop greater faith in Jesus Christ, a testimony of the prophetic calling of Joseph Smith, the ongoing Restoration of the gospel of Jesus Christ, and the continuation of prophetic authority.
- Evaluate the reliability and validity of doctrinal and historical source material, and constructively manage ambiguity. Students will practice critical thinking skills useful in resolving contemporary challenges to faith.
- Become more confident in explaining, defending, and applying the foundational doctrines of the ongoing Restoration and in maintaining lifelong spiritual growth within The Church of Jesus Christ of Latter-day Saints.

31. REL 333: Teachings of the Living Prophets (or other religion elective course)

- Identify, describe, and apply the doctrines and principles taught by latter-day prophets, emphasizing those found in the most recent general conference.
- Discover and share key aspects of the workings of God in the lives and backgrounds of the current First Presidency and Quorum of the Twelve Apostles.
- Describe the order of succession in the Presidency and Apostolic seniority, what it means to preside, and the principle of revelation as it relates to jurisdiction.
- Define priesthood, priesthood keys, and delegated authority.
- Exemplify faith in Jesus Christ by applying the teachings (both word and deed) of the latter-day prophets, and esteem them above personal, philosophical, and political ideologies.

32. REL 324: The Doctrine and Covenants — Part One (or other religion elective course)

- Develop greater faith and testimony in Jesus Christ, and deepen personal conversion.
- Read and understand the context and content of the text for the course.
- Develop an ability to learn and teach by the Spirit.
- Develop a habit of regular scripture study.
- Identify, understand, and apply doctrines and principles from the scriptures and the words of the prophets.
- Develop the ability to explain, share, and testify of true doctrines and principles.
- Master key scriptural passages by being able to understand, explain, and apply them to everyday life.

33. REL 325: The Doctrine and Covenants — Part Two (or other religion elective course)

- Develop greater faith and testimony in Jesus Christ, and deepen personal conversion.
- Read and understand the context and content of the text for the course.
- Develop an ability to learn and teach by the Spirit.
- Develop a habit of regular scripture study.
- Identify, understand, and apply doctrines and principles from the scriptures and the words of the prophets.
- Develop the ability to explain, share, and testify of true doctrines and principles.
- Master key scriptural passages by being able to understand, explain, and apply them to everyday life.

34. FCS 160: Family Leadership and Resource Management

- Develop a personal mission statement for life.
- Analyze priorities to managing time.
- Examine personal finances.
- Apply communication and trust to improve relationships.

35. GESCI 110: Sustaining Human Life

- Explain the strengths and limitations of the scientific process as a source of knowledge.
- Identify engaging fields of study with good career potential.
- Analyze compelling and important questions using scientific evidence.
- Discuss challenging issues in a respectful and productive manner.

36. HUM 110: Discovery and Discernment Through the Arts

- Examine literature and theater at a college level.
- Evaluate art works according to aesthetic principles.
- Analyze elements of music to find personal meaning.
- Analyze film composition to gauge artistic value.
- Recognize truth, goodness, and beauty as expressed through the arts.

37. PUBH 132: Personal Health and Wellness

- Identify personal wellness, skills, behaviors, and routines.
- Examine current lifestyle as it relates to personal wellness.
- Explore physical, mental, emotional, spiritual, social, and environmental wellness practices.
- Apply personal behaviors, habits, or patterns that promote optimal wellness.

38. PEACE 101: Conflict and Peace

- Analyze basic dynamics of conflict.
- Approach different conflicts with clarity, charity, and respect.
- Propose viable solutions to real-world conflicts.
- Develop strategies for collaborative problem-solving.