SOFTWARE DEVELOPMENT BOOTCAMP
# Table of Contents

About the Software Development Bootcamp ........................................... 03  
Preparing You for a Software Development Career ................................. 04  
What You Will Learn .................................................................................. 05  
Program Structure ...................................................................................... 06  
Teaching Methodologies ............................................................................. 07  
Commitment to Success ............................................................................... 08  
The Five-Step Developer Education Process ............................................. 09  
Program Flow .............................................................................................. 10  
What's Included .......................................................................................... 12  
The ThriveDX Difference ........................................................................... 12  
Industry Certifications ............................................................................... 13  
Program Breakdown by Course ................................................................. 14  
  
  - Course 1: Introductory Course ................................................................. 14  
  - Course 2: HTML & Web Accessibility .................................................... 14  
  - Course 3: CSS & CSS Frameworks ......................................................... 14  
  - Course 4: User Experience & User Interface Design ............................ 15  
  - Course 5: JavaScript & Front-End Web Development .......................... 15  
  - Milestone Project 1: Browser Game ..................................................... 15  
  - Course 6: Back-End Development & APIs .......................................... 15  
  - Course 7: React & Redux ...................................................................... 16  
  - Course 8: SQL & Data Modeling ............................................................ 16  
  - Milestone Project 2: MERN Stack Application ..................................... 16  
  - Course 9: Cybersecurity ...................................................................... 16  
  - Course 10: Principles of Programming with Python ............................ 16  
  - Course 11: Advanced Topics ................................................................. 17  
  - Milestone Project 3: Final Project ........................................................ 17  
  - Course 12: Career Services .................................................................. 17  

Program Summary ...................................................................................... 18
About the Software Development Bootcamp

Software developers are valuable for a variety of reasons, including their ability to address all points of a development project, work on back-end and front-end development, reduce the cost of projects, support all team members, and more.

From mobile banking to connected homes to autonomous vehicles, nearly every aspect of our lives is now dependent on lines of code. Whether it’s a virtual assistant, smart insulin pump, or any other web-connected device, it needs coded instructions to work.

Businesses need builders, thinkers, and leaders. In this program, you will gain the tactical software engineering principles, soft skills, problem-solving, and communications skills to become a successful software professional and an asset to any team.

The goal of the NC State Software Development Bootcamp is to take you from little or no experience to a ready-to-hire developer by providing you with the most up-to-date skills and hands-on experience companies look for in qualified software developers. Software developers have many advantages over other job seekers because they can organize an entire project, see the big picture, and work on a variety of programming assignments. From designing impactful user interfaces to server-side programming to database applications, software developers can help with both the design and functional aspects of any project.

The skills required in the professional landscape are evolving. The workforce needs more people who can work responsibly with data and build applications that are accessible to everyone. Technological advancements are moving quickly and there simply aren’t enough people equipped with the skills needed to fill the open software developer positions.

To address this massive deficit in the workforce, NC State is offering the Software Development Bootcamp. Our industry-leading instructors and program developers work continuously to discover the skills gap in the workforce and include those skills in the Software Development Bootcamp curriculum.* This allows the needs of the market to drive the content of the curriculum and the experience that closely aligns with the challenges current businesses face.

* We reserve the right to amend the course material according to market demand and to maintain relevance in the industry.
Preparing You for a Software Development Career

The accelerated **Software Development Bootcamp** at NC State is built for those from any professional background who have a strong affinity for technical solutions, enjoy aspects of conceptual and visual design, and seek creative ways to solve problems. The program provides you with the skills and hands-on experience companies seek in qualified software developers and coding professionals.

Upon program completion, you will be qualified for a variety of software development and coding roles,* including:

- Software Developer
- Software Engineer
- MERN Stack Developer
- Front-End Developer
- Web Developer
- Application Engineer
- Software Programmer
- Python Developer
- Back-End Developer

* Job titles listed do not necessarily reflect entry-level positions.

According to the **US Bureau of Labor Statistics**, jobs for web developers are expected to increase by 13% in the 10-year period spanning from 2018 through 2028.
What You Will Learn

**Web Design**
- Front-End Technologies: HTML, CSS, and JavaScript
- Web Accessibility Best Practices
- CSS Frameworks
- User Experience
- User Interface Design
- Agile Software Methodology
- Responsive Design

**Web Development**
- Back-End Frameworks
- Node.js and Express
- API Development
- API Documentation
- API Best Practices
- React Web Applications
- Data Modeling
- SQL and NoSQL

**Software Engineering**
- Cybersecurity
- Cloud Architecture
- Python Programming
- DevOps
- TypeScript
- Sass
- Server Deployments
- Serverless Deployments
- Testing Methodologies
- Platform as a Service (PaaS)

What You Will Build:
- Beautiful and intentional user interfaces that follow best practices for accessibility and design
- Dynamic applications that respond quickly to user interaction and persist data using RESTful APIs and both SQL and NoSQL databases
- Applications that use modern browser technology to connect users in real-time
- Secure applications that protect user data using a variety of techniques
- Cloud-deployed applications that can scale to handle large user bases

The accelerated programs powered by ThriveDX help reskill and upskill learners in today’s fast-growing digital economy. With over a decade of experience as the world’s premier digital skills and cybersecurity education provider, ThriveDX works with top-tier academic institutions, government organizations, and global enterprises to offer advanced workforce and professional development programs in digital technology.
The NC State Software Development Bootcamp aims to provide you with the knowledge base and practical experience you need to obtain a role in the software programming field. The curriculum integrates real-world projects and training exercises with software engineering theory to provide practical experiences, tools, and insights you need to succeed as a professional developer.

In the Software Development Bootcamp, you attend lectures, take part in individual and group exercises, and gain access to virtual labs and real-life projects that teach you how to create user experiences through client- and server-side development best practices.

The Software Development Bootcamp was designed to meet the needs of working professionals. The program offers flexible evening and weekend course schedules and consists of a total of 400 in-class hours.

### 30-Hour Introductory Course

This unique Introductory Course will provide you with a taste of the industry and serve as a chance to make sure software development is the right career for you. The course will include theory and practice of coding, as well as a short exam covering the fundamentals of the industry.

### Portfolio Projects

You will complete three experiential training projects that you can showcase on your personal portfolio website when applying to jobs in the field:

- A front-end, in-browser game that demonstrates your skills in HTML, CSS, and JavaScript
- A MERN stack project that demonstrates software ability, including React on the front end, Node.js/Express on the back end, and persistent data in a MongoDB NoSQL database
- A back-end project that utilizes Python or Node.js and showcases skills of your choice

### Experiential Learning

This hands-on program provides knowledge of industry tools, methods, and coding languages, including:

- HTML5, CSS3, and JavaScript
- MERN Stack (Mongo, Express, React, Node.js)
- Node.js and Python
- SQL and Data Modeling
- RESTful APIs
- Python Programming
- GitHub and DevOps
- Object-Oriented Programming
- Database Management (PostgreSQL, MongoDB)
- Functional Programming

### Career Services

Career Services will ensure you have the best chance possible when applying for a position in software development and coding. Together, we will work on your resume, LinkedIn profile, and interview skills. We also will provide internship placement assistance and connect you with professional networking opportunities.

### Certification Preparation

The Software Development Bootcamp will prepare you for a number of globally recognized engineering and developer certifications.*

- AWS Certified Developer
- Microsoft Azure Engineer
- Google Cloud Developer

---

* Certification exams are not conducted as part of the program and require additional costs not included in tuition. While the curriculum provides the knowledge needed to perform well on industry exams, the NC State Software Development Bootcamp is not a test-preparation program, where the primary focus is your performance on the exam. This program is designed to teach in-demand knowledge for today’s workforce.
Classes are conducted in live, synchronous, virtual classroom environments. This allows for a program that is nimble and adaptable, much like the industry itself. This provides you with the opportunity to learn in an environment that is aligned with the profession and allows you to balance education with your other responsibilities. The program applies foundational elements from advanced teaching methodologies that include:

**Advanced Remote Education Technologies**
You can take advantage of industry-leading remote technologies that increase the comprehension level of course modules. Being able to instantly message instructors, virtually raise your hand during class, and collaborate with peers via remote workspaces ensures you have the tools you need to learn even the most intricate concepts.

**Instruction by Experts in the Field**
Classes are taught by instructors who are leaders in the industry and who bring a wealth of knowledge and experience to the learning environment. You will benefit from instructors’ current industry expertise as well as from their unique, insider’s understanding of the fast-paced field of software development.

**Synchronous, Virtual, Live Classrooms**
Online classes are held by expert instructors and occur on a consistent basis with real-time interaction. Lessons stem from top-tier instructional methodologies and are enhanced by cloud-based chat software that allows live, hands-on interactions between you and your instructors.

**A Library of Recorded Classroom Sessions**
Curated by professionals currently working in the field, the course curriculum is consistently updated to reflect new platforms, applications, technologies, and trends and is made available for you to review at your convenience. Recorded classroom sessions provide the opportunity to revisit any topics that were discussed during a lesson.

**Online Q&A Sessions with Instructors**
Through virtual, instructor-led question and answer sessions, you can request clarification on challenging concepts or ask for assignment feedback from instructors. This community environment promotes the kind of teamwork and collaboration that translates outside of the classroom.

**Career Services Workshops**
Three Career Services workshops provide you with the resources you need to successfully prepare for a job interview. The dedicated Career Services team is prepared to support you with resume building, interview training, LinkedIn profile assembly, and connecting you with hiring partners to help you land the job of your dreams.

**Hands-on Projects & Campaigns**
With a number of monthly projects, you have numerous opportunities to practice your digital skills in a virtual environment alongside your instructors to ensure in-depth comprehension. You can also apply the skills gained in your virtual lessons to real-world scenarios and gain extensive experience solving problems while obtaining feedback from industry experts.

**Extended Virtual Office Hours**
You are encouraged to prepare your own questions regarding lessons, as well as any concerns about your progress in the course.
To ensure a quality match between you and the program, and to maintain the competitive integrity of each individual, a revolutionary educational model is rooted in an admissions process that assesses your practical aptitude in your field of interest alongside your theoretical knowledge of the subject.

You will participate in a 30-hour Introductory Course focused on introductory material, hands-on training, and critical thinking to provide you with a taste of the field and the experience you need to be sure software development is the right career path for you. At the end of the Introductory Course, you will take an assessment exam and evaluate your progress with an Admissions Advisor to determine if the program is suitable for you.
The Five-Step Developer Education Process

The Five-Step Developer Education Process is the result of over a decade of proven research conducted by global industry experts. It combines unique teaching methods and curricula that ensure you receive the highest-quality education possible with the aim of helping every individual complete the program with the competitive skill set today's job market demands.

01 Talk to Us
Set up a free consultation with an Admissions Advisor to assess your aptitude in the field and determine appropriate placement in one of the Software Development Bootcamps.

02 One-on-One Meeting
Meet with your assigned Admissions Advisor to further discuss the program, career expectations, and future job opportunities. Meetings can be virtual or on the phone.

03 Introductory Course
This 30-hour course is designed to teach you the fundamentals of coding and software development. After the course, you will take a summary exam and have a one-on-one assessment with an Admissions Advisor to examine your future in the program.

04 The Program
The ThriveDX-powered Software Development Bootcamp curriculum is developed and refined by experts in the field. The program provides immersive, hands-on, experiential training that is centered on coding languages and knowledge transfer methodologies.

05 Career Services
The Career Services course provides personalized interview training, internship placement assistance, and professional networking to help you get hired for your first specialized software development position.* Guidance is provided throughout the program to help prepare you to enter the field of software development.

* Career Services are consultation-based only and do not guarantee job placement.

Prerequisites

- You are not required to have a background in any related field, but should be prepared to learn technical concepts at a rapid pace.
- Professional evaluation and skills assessment
The **Software Development Bootcamp** is divided into three parts. The first group of courses covers the fundamentals of development and focuses mainly on the front end. The second part focuses on what is referred to as the MERN Stack, one of today’s most popular technologies for building a single-page app. The third section focuses on Python, a powerful programming language used for a variety of purposes, including web applications and beyond.

### Part 1: Web Design

In these courses, you will learn in-depth web development concepts and techniques. You will also gain knowledge of the basics of web development—including HTML, CSS, programming with JavaScript, and source code management with Git—and practice using industry tools such as GitHub.

- **HTML & Web Accessibility**
- **CSS & CSS Frameworks**
- **User Experience & User Interface Design**
- **JavaScript & Front-End Web Development**
- **Milestone Project 1: Browser Game**
Part 2: Web Development

These courses will teach you the principles of web development. You will not only learn about server-side programming and custom APIs but also how to build robust user interfaces, create normalized data models, and more.

- Back-End Development & APIs
- React & Redux
- SQL & Data Modeling
- Milestone Project 2: MERN Stack Application

Part 3: Software Engineering

After gaining the practical knowledge of web development best practices, you will have an understanding of how to create fully functioning, end-to-end applications that solve business problems. In the advanced courses in this category, you will acquire a better understanding of different programming languages and the infrastructure needed to scale. You will also learn how to implement security.

- Cybersecurity
- Principles of Programming with Python
- Advanced Topics
- Milestone Project 3: Final Project
What's Included

Professional Networking  

11 Specialized Courses  

3 Dedicated Career Services Workshops

100+ Asynchronous Content Hours

Experiential Learning  

3 Milestone Projects  

3 Dedicated Test Preparation Workshops  

400 In-Class Hours

Dedicated Career Services Workshops  

100+ Asynchronous Content Hours

The ThriveDX Difference

NC State’s Software Development Bootcamp was developed in partnership with ThriveDX, the world’s premier digital education company. This ThriveDX-powered program employs industry leaders to develop and teach curriculum tailored to today’s job market, including hands-on simulation labs that support individuals aspiring to build a career in technology. Top-tier universities like NC State partner with ThriveDX to offer accelerated professional development programs for learners from all backgrounds.

When you enroll in a ThriveDX-powered program, you will go through a selective sorting process that ensures the success of each program is not measured solely by program completion rate, but also by your attendance, class participation, career acceleration, and periodic feedback surveys. Programs powered by ThriveDX include a comprehensive career services course dedicated to launching and advancing your career through interview coaching, resume building, internship placement assistance with global hiring partners, and professional networking opportunities.
The NC State Software Development Bootcamp prepares you for an exciting career in application development. To further help you stand out to employers, the program helps set you up for success with the industry’s most recognized exams.*

Training for certification exams** includes one of the following:†

- AWS Certified Cloud Practitioner
- Microsoft Certified: Azure Fundamentals
- Google Professional Cloud Developer

With these certifications, you can continue building a career developing scalable enterprise software applications upon completion of the Software Development Bootcamp.††

---

* While the curriculum covers some of the knowledge needed for industry exams, this program is not a test preparation program, where the primary focus is your performance on the exam. The program is designed to teach in-demand knowledge for today’s workforce.

** Certification exams are not conducted as part of the program and require additional costs not included in tuition.

† Any test preparation session that may be provided is not mandatory and is not part of the program curriculum. Workshops are designed to provide extra resources and help for those who wish to take specific exams.

†† You must have a minimum of one year of cumulative work experience in the specific cloud provider in order to be certified.
# Program Breakdown
## By Course

### Course 1
**Introductory Course**  
30 Hours

The Introductory Course provides an accurate representation of what the entire Software Development Bootcamp will teach. It gives you a short overview of the first five courses in a way that focuses on projects you can immediately begin to build to showcase your skills to potential employers.

Before taking the Introductory Course, you should have:

- A computer that can run the latest distribution of a modern-day operating system, such as MacOS, Linux, or Windows
- A typing speed of 30 WPM or better
- Basic knowledge of using computers, such as how to open programs, point and click, and navigate to a website via a web browser
- Knowledge of basic math through algebra

### Course 2
**HTML & Web Accessibility**  
12 Hours

The HTML & Web Accessibility course provides you with a strong foundation in the building blocks of web pages, prepares you for later courses, and ties web development into current events and real-life situations.

**Topics:**
1. Introduction to HTML
2. Containers, Tables, and Lists
3. File Paths: Best Practices
4. HTML Media
5. Forms
6. Semantic HTML and Web Accessibility

### Course 3
**CSS & CSS Frameworks**  
20 Hours

The CSS & CSS Frameworks course gives you the ability to style the layouts you learned to create in HTML & Web Accessibility. This course covers a wide variety of techniques for styling an interface for the web, beginning with foundational concepts and common practices for writing CSS by hand and concluding with the usage of related tools that style more efficiently.

**Topics:**
1. Intro to CSS
2. Simple Styling
3. Animation and Transforms
4. Responsive Layout and Flexbox
5. CSS Frameworks
User Experience & User Interface Design

The User Experience & User Interface Design course introduces the research skills you need to identify your users and the solutions that you need. Learning about UX/UI further solidifies the earlier concepts of usability and accessibility. Learning about Agile methodology prepares you for product and time management on cross-functional, self-managing teams.

Topics:
1. Introduction to UX and UI Design
2. Visual Branding for the Web
3. Accessibility for the Web
4. Digital Layout
5. Design Systems
6. Introduction to UI Design Patterns
7. Advanced UI Design Patterns
8. Introduction to Sketch, Figma, and Adobe XD
9. Workshop I
10. Workshop II
11. How to Present UX/UI Design
12. Design Presentations

JavaScript & Front-End Web Development

The JavaScript & Front-End Web Development course gives you the fundamentals of your first programming language, allows you to practice DOM manipulation and events on front-end web pages, and introduces more advanced JavaScript topics to scaffold topics in later courses.

Topics:
1. Variable Declaration
2. Control Flow
3. Functions
4. Asynchronous JavaScript
5. Object-Oriented Programming with JavaScript
6. Interactive Web Pages
7. Dynamic Web Pages
8. Project: Create an Interactive Map

Browser Game

This milestone project allows you to explore your skills in the areas of HTML, CSS, and JavaScript. You demonstrate your ability with DOM manipulation and connecting events in a web browser. Additionally, you have the opportunity to design a functional and elegant user experience as you deploy the game on the web and share it with your classmates. The browser game milestone project will be formally reviewed by the instructional team in the following areas:

1. User Experience
2. Functionality
3. Workflow
4. Code Style
5. Presentation

Back-End Development & APIs

The Back-End Development & APIs course opens up the world of server-side programming via Node.js and Express and enables you to create and document custom RESTful APIs while following best practices and using industry-standard tools for testing.

Topics:
1. Client-Server Architecture
2. NPM and Node.js
3. Intro to Express
4. Server-Side Rendering with JSX
5. RESTful Routing
6. MVC Architecture
7. MongoDB and NoSQL
8. Mongoose and ODMs
9. APIs and Documentation
10. Cloud Deployment
### Course 7
**React & Redux**

44 Hours

The React & Redux course builds on the concepts of the JavaScript & Front-End Web Development course, teaching you to use current industry tools to build more robust user interfaces and state management.

**Topics:**
1. JavaScript Tooling
2. React Fundamentals
3. React Dataflow
4. Styling in React
5. Testing in React
6. Redux Fundamentals
7. React-Redux
8. Advanced Redux

### Course 8
**SQL & Data Modeling**

24 Hours

SQL & Data Modeling prepares you to use relational databases and manage data at a large scale. You practice creating normalized data models, migrations to manage schema and content over time, and common optimization techniques for the industry.

**Topics:**
1. History of Relational Databases
2. Basic SQL
4. Advanced SQL
5. SQL in Node.js

### Course 9
**Cybersecurity**

20 Hours

The Cybersecurity course introduces you to the fundamentals of access management and encourages you to prioritize securing data and identifying proper and improper access to information. You build applications to support user authentication and authorization. Discussion topics include several common security flaws and tactics to protect against them.

**Topics:**
1. History of Cybersecurity
2. Common Attack Patterns
3. Identity and Access Management

### Course 10
**Principles of Programming with Python**

36 Hours

The Principles of Programming with Python course boosts your confidence and solidifies programming fundamentals through learning a new programming language. Additionally, this course makes you well-rounded through delivering computer science theory and discussing useful programming paradigms and applications of programming outside of the web.

**Topics:**
1. Intro to Python Language
2. Python Functions
3. Python Packages and Modules
4. Object-Oriented Programming
5. Functional Programming
6. Web Development with Python
7. Data Structures and Algorithms

### Milestone Project 2
**MERN Stack Application**

24 Hours

This milestone project uses React as the front end, Node.js and Express as the back-end API, and MongoDB (a NoSQL database) to persist data. You use React for a web application.
Advanced Topics

The Advanced Topics course focuses on the exciting ways you can use technology. This course includes one or more of the following topics: Cloud certifications and an introduction to DevOps, Sass, and TypeScript.

Career Services

This optional course provides you with the support and tools you need to successfully prepare to enter the field of software development. Career planning services include interview training, professional networking, internship placement assistance, and consultations devoted to perfecting LinkedIn profiles, e-portfolios, and resumes.

Final Project

This milestone project allows you to gain extra practical knowledge and create a portfolio project in a more specialized area of knowledge. You may choose any of the topics covered in the previous courses to delve deeper into for the purposes of a final project, and you are encouraged to pursue an area that aligns with your job-related interests.

Boost your confidence and solidify programming fundamentals through learning a programming language.
# Program Summary

<table>
<thead>
<tr>
<th>Courses</th>
<th>In-Class Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory Course</td>
<td>30</td>
</tr>
<tr>
<td>HTML &amp; Web Accessibility</td>
<td>12</td>
</tr>
<tr>
<td>CSS &amp; CSS Frameworks</td>
<td>20</td>
</tr>
<tr>
<td>User Experience &amp; User Interface Design</td>
<td>12</td>
</tr>
<tr>
<td>JavaScript &amp; Front-End Web Development</td>
<td>48</td>
</tr>
<tr>
<td>Milestone Project 1: Browser Game</td>
<td>24</td>
</tr>
<tr>
<td>Back-End Development &amp; APIs</td>
<td>48</td>
</tr>
<tr>
<td>React &amp; Redux</td>
<td>44</td>
</tr>
<tr>
<td>SQL &amp; Data Modeling</td>
<td>24</td>
</tr>
<tr>
<td>Milestone Project 2: MERN Stack Application</td>
<td>24</td>
</tr>
<tr>
<td>Cybersecurity</td>
<td>20</td>
</tr>
<tr>
<td>Principles of Programming with Python</td>
<td>36</td>
</tr>
<tr>
<td>Advanced Topics</td>
<td>24</td>
</tr>
<tr>
<td>Milestone Project 3: Final Project</td>
<td>24</td>
</tr>
<tr>
<td>Career Services</td>
<td>10</td>
</tr>
<tr>
<td>Asynchronously delivered materials</td>
<td>100+ hours</td>
</tr>
<tr>
<td>(not included in count of class hours)</td>
<td>available</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

Asynchronously delivered materials (not included in count of class hours)

---

919.874.5441
McKimmon Center, 1101 Gorman Street, Raleigh, NC 27606
digitalskills.continuingeducation.ncsu.edu