

Careers in Code

Syllabus / Curriculum - Cohort 2

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Roadmap

[You can view the roadmap for the program here.](#)

Module 0 (Week 0): Welcome to Careers in Code / Orientation (1 hour)

Description

Welcome to the program! Module 0 will be a 1-day event. For the first half, we'll introduce all of the students, instructors, and partners involved in Careers in Code. For the second half, we'll distribute laptops for everyone and get your basic development environment setup. We'll also discuss the learning policy and honor policies. You'll also create any relevant accounts you need to complete the program.

What You'll Learn / Key Objectives

- An introduction to students, instructors, and partners of the program
- Receive a laptop
- Configure a basic development environment
 - Visual Studio Code
 - Google Chrome
 - Terminal

- Understand the learning and honor policies
- Sign up for relevant accounts
 - Github
 - FreeCodeCamp
- Discussion of the curriculum and project milestones
- How to access the course classroom
- Determine coworks memberships
 - Standard
 - Membership
 - Flex hours

Module 1 (Week 1): The Development Big Picture (12 hours)

Description

In the first module, we'll drill home the big picture of development before writing any code. We'll go over things like searching effectively, the different fields of computer science, how the internet works, and an understanding of what a technology stack is and why we are leveraging a full-stack javascript stack. We'll also discuss an introduction to agile to help manage your own work and projects throughout the course.

What You'll Learn / Key Objectives

- Review your 24-week roadmap and everything you'll learn throughout your journey
- Understanding how the internet works
- How to search effectively
- Understanding the different fields of computer science
- Continue setting up your development environment
- A high-level understanding of technology stacks and the full-stack javascript stack
- Understanding product/project management
- Basic agile foundations and the Software Development Lifecycle (SDLC)
- Basic organization strategies for the program

Project: Set up a trello board

Create a trello board to help you start managing your projects incorporating basic project management principles.

Module 2 (Weeks 2 - 3): Web Development Fundamentals and Wireframing (24 hours)

Description

In module 2, we'll dive into lessons and hands on exercises exploring the fundamentals of web development. You'll start to learn the building blocks of the web, HTML, CSS, and Javascript while exploring common

developer tools and troubleshooting/debugging practices. We'll also cover basic wireframing, unix, git, and ultimately deploy your first simple website.

What You'll Learn / Key Objectives

- Basic Wireframes
 - Converting requirements into layout
 - Grid system
- Basic HTML, CSS (css flexbox, css grid) and Javascript
- Basic UNIX (command line - navigating file structures, configuring environments)
- Basic Git
- Basic GitHub - Create an account
- Debugging and Troubleshooting techniques
- Familiarity with common developer tools (Chrome dev tools, text editors)
- Basic DOM (Document Object Model)
- Understanding how to translate business requirements into code, i.e. "Business Process To Code 101"
- Deploy a static website on hosting (GitHub Pages or Netlify?)
- What's a CMS? Wordpress?

Project: Create a wireframe and deploy a 3-page website of the eCommerce store

Create a wireframe for an eCommerce store, write HTML and CSS to create it, push it to GitHub, register a domain, and finally deploy it to Netlify, a static site generator.

Module 3 (Weeks 4 - 5): Visual Design, Accessibility, Responsive Web Design, Bootstrap (24 hours)

Description

In Module 3, we'll continue to improve our HTML and CSS skills. We'll dive into visual design, accessibility, and responsive web design.

What You'll Learn / Key Objectives

- Understand what visual design is and how to apply different techniques (typography, color theory, graphics, animation, page layout)
- Understand and implement accessibility techniques for people with visual, auditory, mobility, or cognitive disabilities (screen readers, alt text, HTML5 semantics, tab indexing)
- Understand responsive web design principles (media queries, preprocessors (.scss))
- Understand responsive web design frameworks (Bootstrap)
- Converting wireframes to mockups using Bootstrap components

Project: Responsive eCommerce website from a responsive mockup

You'll create a responsive mockup with Invision of an eCommerce store homepage, then you'll create a fully-responsive website based on the mockup.

Module 4 (Weeks 6 - 7 - 8 - 9): Fundamental Programming and Javascript (48 hours)

Description

In Module 4, we'll dive into programming fundamentals using javascript for the first half. Then, we'll dive into functional programming fundamentals and ES6 javascript skills. We'll also explore how to think algorithmically.

What You'll Learn / Key Objectives

- Thinking algorithmically (pseudocode, project design and planning)
- Basic Javascript
- Programming fundamentals using javascript (algorithms, data structure, objects, arrays, functions, arguments, control flow (if, switch), iterables, variables, scope, hash tables, stacks, queues, trees, model view controller)
- Object oriented programming
- Introduction to functional programming (closures, context, first-class functions, callbacks)
- Asynchronous Javascript and the [event loop](#)
- ES6 javascript skills (let, var, const, arrow functions, template literals, destructuring, looping, spread, rest, classes, callbacks → promises → async/await, map, reduce, filter)
- High-level overview of transpilers, bundlers, and npm
- Debugging

Project: Interactivity to our eCommerce website

You'll create some basic interactivity to the eCommerce website using your new Javascript skills.

Module 5 (Weeks 10 - 11): HTTP & API's, RestFUL APIs, JSON & Ajax (24 hours)

Description

In Module 6, we learn all about HTTP, requests and responses, consuming RESTFUL API's, parsing JSON, and using Postman.

What You'll Learn / Key Objectives

- Understanding TCP / IP
- Understanding HTTP / HTTP2 and response codes
- Understanding requests / responses, headers, client-server architecture
- Understanding common HTTP verbs (GET, POST, PUT, PATCH)
- Using API's to pull in data and normalizing it
- [Principles of restful design](#) (uniform interface, client-serve, stateless, cachabel, layered, code on demand)
- Using Postman to call API's
- CRUD operations with API's

Project: Pull in store data using an API

You'll use an API of your choosing to pull in sample store data from at least one source.

Module 6 (Weeks 12 - 13 - 14): React (36 hours)

Description

In this module, we'll do a deep dive of React fundamentals and learn about the ecosystem.

What You'll Learn / Key Objectives

- Fundamental Topics
 - Create react app, JSX, components (functional and class), Virtual DOM, state, props, children, conditional rendering, pure functions, component life cycle, lists and keys, basic hooks
- Advanced Topics
 - Advanced hooks, higher order components,
- Ecosystem
 - Routers (React/Reach), SSR (Next.js, Gatsby), API calls (Apollo, Relay), React Native, Forms (Formik), Testing (Jest, Cypress), State Management (Context, Redux), Styling (Styled Components)

Project: Create a React application to consume your API

You'll create a react application that consumes your REST API you created in the last two modules.

Module 7 (Weeks 15 - 16 - 17): Intro to Server-side Javascript with Node.js, Making our own API's (36 hours)

Description

In Module 6, we'll cover an introduction to server-side javascript with Node.js and create our own API using Express.js and consuming the data.

What You'll Learn / Key Objectives

- Core Node.js concepts (npm, package management, node console, serving files and assets, middleware, routing)
- Model View Controller (MVC)
- Introduction to templating engines
- CRUD operations with your own API

Project: Create your own REST API and consume it on the eCommerce website

You'll create your own REST API with full CRUD operations and consume it on the front-end of your eCommerce website.

Module 8 (Weeks 18 - 19): Intro to Databases, Data Modeling with SQL (24 hours)

Description

In module 7, we'll build upon what we did in the last module and query a database to start pulling in data into our API we created. We'll learn the differences between SQL, noSQL, and how to model data. Then, we'll do a deep dive of SQL.

What You'll Learn / Key Objectives

- SQL and noSQL and understand the differences and use cases between the two
- Database modeling and ORM (object relational mapping) with Sequelize ORM
- Introduction to entity relation diagrams (ERD)
- Normalizing data
- Deploy our database
- Using a DB module with an API model

Project: Create a database and use it in your REST API to store data about the eCommerce store

You'll use a database to get data from our endpoints instead of mock JSON data and incorporate it into our eCommerce store.

Module 9 (Weeks 20): Testing (12 hours)

Description

In this module, we'll cover how to test your code through integration testing, unit testing, functional testing and common tools for doing so.

What You'll Learn / Key Objectives

- Test Driven Development Overview
- Integration Testing
- Unit Testing your React Application (Jest, react-testing-library, Mocha, Karma, Enzyme)
- End to End Testing (Protractor, Cypress.io)

Project: Write tests for your application

You'll write simple unit tests for your web application you created.

Module 10 (Weeks 21): Infrastructure, Deployment, DevOps (12 hours)

Description

In this module, we'll deploy the React and Node app we created to a cloud provider.

What You'll Learn / Key Objectives

- A high-level overview of the different cloud providers for both hobbyist projects and enterprise development (AWS, GCP/Firebase, Heroku, Digitalocean)
- A high-level overview of DevOps (Docker / Kubernetes, Continuous Integration tools like Jenkins / CircleCI)

Project: Deploy your React and Node web applications

We'll deploy your React and Node applications.

Module 11 (Weeks 22): Intro to Cryptography, Authentication & Authorization (12 hours)

Description

In this module, we'll cover the different ways to authenticate and authorize users on your web application.

What You'll Learn / Key Objectives

- Cryptography basics
- Authentication methods for web application (Cookie, Token, OAuth, SAML)
- Authorizing users in your application (CRUD permissions, auth guards)

Project: Implement a simple login for your application

You'll implement a basic login using an authentication method.

Module 12 (Week 23): Cybersecurity fundamentals and web security (12 hours)

Description

In this module, we'll cover the fundamentals of cybersecurity and web security best practices for your application.

Module 13 (Week 24): Capstone work and presentations

Description

In the final module, you'll have time dedicated to work on your capstone and ask your students and instructor for help. The capstone project should encompass a stack of your choosing.