# Software Engineering Immersive Course Guide

A rigorous curriculum that's made
for a high-paying career

# Our course

Our Software Engineering Immersive course is designed to teach you the skills you need to work as a professional web developer.

We focus both on writing code and skills used when working in professional teams like participating in code reviews, using Agile planning, giving technical presentations, and pair programming.

## PHASED LEARNING

We've organized our curriculum into four 4-week phases
so you'll learn web development at the right pace.

### Phase 1 and 2

In the first two phases, lessons focus on the fundamentals of front-end and
back-end development. Front-end development teaches you all about the code
used in the browser: HTML, CSS, and JavaScript. In the back-end development
phase, we learn about code that runs on a server using Python, how to set up
and use relational databases, and how to develop fully functioning web
applications using the Django framework.

These classes are a combination of lecture, technology demonstrations, team
exercises, and assessment. Students will have a project they are working on at
all times, with sizes ranging from a one-day project to a week-long project.
Students will be expected to work on these projects outside the classroom
during the rest of their time on campus and during the evenings and weekends.

### Phase 3

In phase 3, students will pick between two (or more) specializations, where they
will expand on the knowledge they have already learned. At this point, they will be
taking more responsibility for their learning. We use a flipped classroom model,
where students receive readings, videos, and recordings to consume and then we
meet to discuss those materials, as well as other research the students have
done. Students will meet three times a week with an instructor for these
discussion groups. They will also have weekly projects exercising what they are
currently learning. Unlike previous projects, though, these will have places where
the student will make decisions about features and technologies used.

### Phase 4

The fourth phase is the capstone of your experience at Momentum and where
you will make the transformation from student to developer. You will spend the
final four weeks of the course working on a large software project in a group of
three to five developers from both the front-end and back-end specializations.
This project will be larger than anything you have tackled before and will likely
use technologies you will learn during these four weeks. At the end of the
phase, you will present your project to an audience of local tech professionals,
hiring partners, and your peers.

This project is a special experience that you will remember forever. It's a time of
intense creativity and work where you will learn as much as you learn from the
rest of the course. The goal of the previous twelve weeks is to prepare you for
these four weeks that will launch your new career.

## CLASSROOM INSTRUCTION

Phase 1 and Phase 2 are similar in structure. During those phases, you will have classroom time from 9:30 AM to 11:30 AM and 3:00 PM to 4:30 PM Monday through Thursday. This time will consist of lectures, live demonstrations, and in-class exercises to teach you the fundamentals of each topic. In the first phases of the course, you can expect more lecture and live demonstrations by the instructor. As we move through the course, classroom time becomes more student driven with Q&A sessions and student demonstrations.

In Phase 3 you will focus on your chosen specialization of front-end or back-end development. You will work together in a group to research and use current technologies like AWS and React. You'll meet with your instructor for three sessions a week plus lab time, where you will build projects that integrate the two specializations. During this phase, you'll learn the most important developer skill of all: how to keep learning every day.

In Phase 4, you will work on a project you design and then build with a group. You'll have scheduled progress check-ins with your instructors. The structure of the day reflects that of a work day at an Agile startup with the added expectation that you will work into the evenings and the weekends to complete the project and work with teammates. At the end of this phase, you'll have an ambitious project in your portfolio and you'll present it to a team of instructors and local developers.

On Friday mornings, we have our "huddle," where we talk about the week and have one or more guests come to talk to our students about topics like imposter syndrome, networking effectively, and creating your work portfolio. Guests also come some afternoons during the week for expert lectures.

## ASSIGNMENTS

You will always have an active assignment to work on during each phase of the course. Assignments will sometimes require you to work on your own, sometimes with partners, and sometimes in a group, with group work more common later in the course.

In general, during Phases 1 – 3, assignments given Monday through Wednesday are sized to be done in one day. Thursday assignments are larger, intended to be worked on Thursday, Friday, and during the weekend. Each afternoon, we have lab time, where instructors are present to work with you on your assignments and answer your questions.

During Phase 4, students will work on a capstone project with a group. This project will be the largest piece of work a student will complete and will be developed with an Agile project methodology that reflects real-world professional work.

# WEEK-BY-WEEK TOPICS

## Phase 1: Introduction to web development

- Software development basics
- Command-line basics
- Version control with Git
- Using a text editor
- HTML
- CSS Basics
- CSS Grid

- Responsive layout
- Web design and UX basics
- Programming in JavaScript
- JavaScript in the browser
- Making requests with JavaScript using fetch
- Debugging tools and techniques

## Phase 2: Introduction to back-end development

- Introduction to Python
- Data types
- Conditionals and iteration
- Python standard library
- Input and output

- Using Python modules
- Django basics
- Relational databases
- Using third-party packages

## Phase 3: Advanced front-end and back-end
Choose one of the following:

**Advanced front-end development**

- Responsive layout
- JavaScript build systems
- Single-page applications
- Progressive web apps
- Testing JavaScript
- React

**Advanced back-end development**

- REST APIs
- SQL
- Background jobs
- Websockets
- Deployment
- Testing Python

## Phase 4: Agile development

- Agile planning
- Iterative development
- Product ideation and design
- Integration testing
- Final project

# DAILY SCHEDULE

## Phase 1 and 2

**MONDAY – THURSDAY**
9:30-11:30 AM EST – LECTURE
We will review the previous day's lab and cover new material for the day

11:30 AM-3:00 PM – LAB
You will have an assignment to work on, either solo or in a group. Instructors will be present to answer questions

3:00-4:30 PM – LECTURE
We will check in about your progress on the lab, review and dig deeper into the day's topics

4:30 PM ONWARD – LAB
Continue working on the day's lab

**FRIDAY**
9:30-11:00 AM – HUDDLE
You'll have a check-in on your progress have a non-technical topic of the week

11:00 AM ONWARD – LAB
You will have an assignment given on Thursday that will continue throughout Friday and into the weekend

## Phase 3

Students are expected to be on campus during our core hours from 9:30 - 5:00. In this phase you are responsible for managing your time each day according to what needs to be done. You'll have a weekly project, for which you'll receive material to watch, read, review, and help you implement the project's requirements. An instructor will meet with your discussion group three times a week to check in on progress, help with blockers, and provide guidance.

## Phase 4

During the first week on phase 4, students will meet daily with an instructor to learn about agile development practices. Instructors will help you create a schedule and a plan for delivering a software product that you'll invent and create. You'll be working with a team of 3-4 people and managing your schedule to meet deadlines and ship your product at the end of the phase. You're expected to be on campus generally, but we won't dictate your hours.

In week one, you will spend each day working with your team and instructors on designing and planning a project. For the last three weeks of the course, your team will build that project, working together onsite and remotely as needed.

# Contact Us

Start a conversation about your future proof career

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