

# ©Typescript Curriculum - overview

Part of the Digitalents programs. Our goal is to upskill developers and teach them high valued skills in the current job market.

- Learn advanced programming concepts
- Gain practical Typescript web development experience

## Prerequisites

You are required to have a sufficient knowledge of [Javascript](#) and [web fundamentals](#) in order to follow along with this course. This includes but is not limited to working knowledge of HTML, CSS, Javascript, Node.js and some experience with NoSQL and SQL databases. If you need more information please consult the [HYF study book](#).

## Practical: Come prepared

In order to start smoothly with the course please take some time to prepare your local environment and set up your personal computer accordingly.

- ☐ A **latest** version of a browser is installed on your personal computer
- ☐ Have an IDE installed (preferably [VS Code](#))
- ☐ [Git](#) is installed on your personal computer
- ☐ The latest LTS version of [Node.js is installed](#)

You will deploy your app and submit your code and assessments and exercises on Github.

- ☐ Sign up for a [Github account](#)
  - ☐ [Configured SSH key](#) for authentication with Github

## Expectations

We expect you to complete all of the assessments by next week. Deadline for submission is **Friday at midnight**.

Assessments must be submitted on Github, pushed to a repository on your profile following the correct naming convention.

Please let the instructors/coaches know when you have submitted.

## Overview

### Week 1: Javascript

This week's focus will be (re)mastering Javascript. We will practise skill by solving programming problems.

#### Objectives

- Understanding the Javascript basics
  - Expressions & operators
  - Functions, closures
  - Data types and data structures
  - Understanding of the types in JavaScript
- Web development
  - Able to interact with the DOM
  - Writing HTML and CSS
- Acquainted with NPM and how to set up a new javascript project
- Able to interact with an API

### Week 2: Intro to Typescript

We'll start by reviewing the most basic and common types you might encounter when writing TypeScript code. These will form the core building blocks of more complex types that we will construct. TypeScript has many ways to describe how functions can be called. This week we will learn about how to write types that describe functions.

#### Objectives

- Understand the difference between Javascript and Typescript
  - Know what the advantages are of using a strictly typed language
- Ability to work with a compiler (tsc)
- Understanding of all basic types
  - string, boolean, number, Arrays, Tuples, any, unknown, void, null and undefined, never, object
- Creating your own types
- Creating and using typed functions

### Week 3: Classes

As with other JavaScript language features, TypeScript adds type annotations and other syntax to allow you to express relationships between classes and other types.

## Objectives

- Object oriented programming in Typescript
- Understanding of SOLID principles

## ☰ Week 4: Type manipulation

TypeScript's type system allows for expressing types in terms of other types. This allows for some very powerful manipulation.

### Objectives

- Understand Generics
  - Implement own function for Generics
  - Ability to work with Generic Type variables
  - Identify use cases for Generics
- Mapped Types
- Setting up your own Typescript environment

## ☰ Week 5 & 6: Web development - Frontend

We will learn how to more easily create an interface for our application. By now you will have experienced that a CLI has its limitations and that managing the state by manipulating the DOM can be very time consuming and challenging. To help us with those problems we will leverage the power of a React. We will learn to build user interfaces with React.

### Objectives

- Understanding of the React library
  - State management
  - Render loop
- Usage of Typescript in advanced context
  - Dealing with externally defined types

## ☰ Week 7 & 8: Web development - Backend

We will learn how to create our own Node.js backend API in Typescript. After this week you should be familiar with concepts like.

We will leverage the Next.js framework to make all this happen.

### Objectives

- Create a backend API with Typescript
  - Read data from a database

- Implement an authentication mechanism
- Ability to deploy a Express app to production

## Week 9 & 10: Project

You will form up in teams of 2-3 people. Within the team you will work on an end-to-end project with Typescript. This means an application that has a frontend and consumes.

### Objectives

- Hone the skills you learned
- Production deployment of a service

# References

## Web development

- [HYF Study Book](#)

## Typescript

- [TypeScript Documentation](#)
- [Learn TypeScript – The Ultimate Beginners Guide](#)
- [How To Use Basic Types in TypeScript | DigitalOcean](#)

## Node.js

- [Node.js with TypeScrip](#)

## React

- [Getting Started – React](#)