

# TypeScript

## За курса:

Настоящият курс обхваща всички аспекти на езика TypeScript, акцентирайки основно върху производителността и качеството на кода, които могат да се постигнат чрез детайлното познаване на езика.

Следват се официалните материали, свързани с последната версия на езика (1.8) и актуални примери от практиката.

Материалът е представен стегнато, но богато илюстриран с практически примери и синтезирани добри практики за разработка. Всяка тема се съпътства и от допълнителни online ресурси със свободен достъп, чрез които курсистите могат да подпомогнат процеса на обучението си. След края на всяка тема курсистите имат възможност да осмислят и затвърдят наученото чрез решаване на реална практическа задача.

Курсът завършва с разработка на SPA приложение: "Your Personal Sommelier" (система за препоръка на вина и ястия), която ще бъде изцяло изградена, като се използват усвоените знания. За да бъде в крак с последните Front-End и local-storage тенденции, в приложението се използват и: Angular2, Ionic 2 и PouchDB.

## За кого е предназначен курса

Курса е предназначен за програмисти, които владеят отлично JavaScript (ES5) и имат желание да усвоят задълбочено TypeScript, с цел да ускорят разработката на SPA, да използват новите ES6 концепции и да създават скалируеми и удобни за поддръжка структурирани JavaScript приложения.

## Програма:

### TypeScript Overview ▼

4 h.

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|---|---------|
| 1. Course intro and resources overview. | 30 min. |
| 2. Design principles behind TypeScript. | 20 min. |
| 3. What is TypeScript?                  | 30 min. |

4. EcmaScript Support.	20 min.
5. Key TypeScript Features.	50 min.
6. TypeScript vs. Other JavaScript Superset languages.	20 min.
7. TypeScript in node.js.	20 min.
8. Transpiler - the TypeScript Compiler.	20 min.
(breaks included)	30 min.

## Taste the new concepts in ES6 and TypeScript ▼ 2 h.

1. Template strings.	10 min.
2. Classes (detailed further)	15 min.
3. Arrow functions (detailed further)	15 min.
4. "for...of" operator.	20 min.
5. Let (detailed further)	5 min.
6. Const.	20 min.
7. Enhanced object literals.	25 min.
(breaks included)	10 min.

## Getting Started ▼ 3 h.

1. Quick Installation.	15 min.
2. TypeScript IDEs integration (Atom/SublimeText3/VisualStudio/)	40 min.
3. From JavaScript to TypeScript.	30 min.
4. TypeScript program structure and hierarchy.	20 min.
5. A Typed "Hello World" example of types and classes.	30 min.
6. Practical Exercises.	25 min.
(breaks included)	20 min.

## Introduction to TypeScript Type System ▼ 3 h.

1. The Structural Typing of TypeScript.	30 min.
2. Type Annotations.	20 min.

3. Type Inferences and duck-typing.	30 min.
4. Type Assertions (Casting)	30 min.
5. The Any type.	10 min.
6. Practical Exercises.	40 min.
(breaks included)	20 min.

## The primitive types ▼ 2 h.

1. Boolean, Number, String, Symbol.	30 min.
2. Void, Null and Undefined.	20 min.
3. User defined enum types.	20 min.
4. Practical Exercises.	40 min.
(breaks included)	10 min.

## The object types ▼ 3 h.

1. Array Types.	40 min.
2. Members.	40 min.
3. User defined enum types.	20 min.
4. Object literals.	20 min.
5. Practical Exercises.	40 min.
(breaks included)	20 min.

## Functions ▼ 4 h.

1. The three types of functions.	20 min.
2. The optional, default and rest parameters.	30 min.
3. Type Parameters.	20 min.
4. The arguments variable.	10 min.
5. Callbacks and function signatures.	30 min.
6. Function Overloads.	30 min.
7. The Return type.	20 min.

8. More on "arrow" functions.	10 min.
9. Practical Exercises.	40 min.
(breaks included)	30 min.

## Scope ▼ 1 h.

1. The JavaScript scope pitfall.	20 min.
2. "Let" precise the scope.	10 min.
3. Practical Exercises.	20 min.
(breaks included)	10 min.

## Classes ▼ 4 h.

1. Class Declarations.	20 min.
2. Properties and Fields.	30 min.
3. Methods (Arrow Functions and Constructors)	20 min.
4. Events.	20 min.
5. Access Modifiers.	10 min.
6. Static Classes and Members.	20 min.
7. Object Literals and Anonymous Types.	20 min.
8. Class Inheritance.	30 min.
9. Super Calls.	10 min.
10. Practical Exercises.	30 min.
(breaks included)	30 min.

## Interfaces ▼ 4 h.

1. Interfaces - introduction and declarations.	40 min.
2. Interfaces as Named Object Types.	20 min.
3. Applying Interfaces as Function Types.	30 min.
4. Declaration Merging.	10 min.
5. Implementing interfaces with Class Types.	40 min.

6. Interface Inheritance - extending Classes.	30 min.
7. Practical Exercises.	40 min.
(breaks included)	30 min.

## Generics ▼ 3 h.

1. Generics bases.	30 min.
2. A generic implementation of a class.	20 min.
3. The "T" Type and its constraints.	20 min.
4. Generic interfaces.	30 min.
5. Class Types in Generics.	30 min.
6. Practical Exercises.	30 min.
(breaks included)	20 min.

## Design Patterns in TypeScript ▼ 3 h.

1. Boost speed and quality with DesignPatterns.	20 min.
2. Using TypeScript in large business projects.	30 min.
3. A practical example with the Singleton Pattern.	30 min.
4. Implementing the Prototype Pattern.	40 min.
5. Solve a real-world categorisation problem with Factory Design Pattern.	40 min.
6. The State Design Pattern	
(breaks included)	20 min.

## Packages and Modules ▼ 3 h.

1. The "separation of concerns" strategy.	20 min.
2. Exporting a module.	20 min.
3. Importing a module.	20 min.
4. Namespaces and Modules.	30 min.
5. CommonJS modules approach.	20 min.
6. TypeScript AMD and RequireJS.	20 min.

7. Practical Exercises.	30 min.
(breaks included)	20 min.

## Declaration Files ▼ 2 h.

1. Shaping the external libraries functionality.	30 min.
2. Get familiar with Declaration Files syntax.	20 min.
3. Best practices for writing clear declaration files.	30 min.
4. Practical Exercises.	30 min.
(breaks included)	10 min.

## Working with TypeScript Transpiler ▼ 1 h.

1. Transpiler - the TypeScript Compiler.	30 min.
2. Transpiling Code from Typescript to Javascript	15 min.
3. A quick look on Transpiler options Cheet Sheet.	15 min.
(breaks included)	0 min.

## Test-Driven Development ▼ 2 h.

1. The benefits.	30 min.
2. Unit testing frameworks.	20 min.
3. Testing with tsUnit.	30 min.
4. Practical Exercises.	30 min.
(breaks included)	10 min.

## Let's "harness all the horses" ▼ 6 h.

1. Build wine recommendation SPA from the ground with TypeScript, Angular2 and Ionic2 - project intro.	20 min.
2. Define the data model and structure.	30 min.
3. Brief intro to Angular2 Components and Services.	30 min.
4. Angular2 - installation and configuration.	20 min.

5. Define the UI Components tree.	20 min.
6. Hello Ionic 2.	30 min.
7. Build the project directory structure.	20 min.
8. PouchDB - The Database that Syncs. Installation and Configuration.	10 min.
9. Build the Consumer service.	50 min.
10. Create the Page Template.	50 min.
11. Test the app.	50 min.
(breaks included)	30 min.

Общо часове: 50 h.

## ***Използвани материали***

1. TypeScript Language Specification, Version 1.8. January, 2016.
2. TypeScript Handbook, Version 1.8. January, 2016.
3. *Mastering TypeScript* by Nathan Rozentals. 2015, Packt
4. *Pro TypeScript: Application-Scale JavaScript Development* by Steve Fenton. 2014, Apress