# QAJSFUND

Instructors guide

**QAPYTH3 V3**

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Introduction

This document is intended to provide help to the existing and new lecturers of the “QAJSFUND” course. The course layout, philosophy and structure will be discussed. This, together with the timing, potential difficulties and comments should help any lecturer in achieving good level of satisfaction when teaching this course.

Please email comments and suggestions concerning this Instructor's Guide to the course consultant.

This course is **not** an introduction to programming. It is targeted at people that are already experienced script designers and/or programmers.

Course-level information

## Instructor’s Pack

Instructors should be provided with the following items:

* QAJSFUND Exercise Guides
* QAJSFUND Presentations
* QAJSFUND Labs and Solutions
* QAJSFUND Instructor Guide (this document)

If any of the items in the list above is missing, take it up with your normal contact with QA.

Errors detected since the printed edition of these manuals are mentioned in the pages which follow, and will be corrected in the next release. If you find any more please report them to the course consultant.

## Course goals

The main purpose of this course is to prepare the delegates for using the JavaScript programming language to create SPAs and to prepare them for using REACTJS.

## VM setup

during the 4-day virtual delivery, delegates will be given access to either LoD machines or have GTMPC access to virtual machines.

The latest QAJSFUND image includes the following:

* VSCode
* NodeJS
* All updated labs and files needed
* Instructor machine will have all presentations, files, challenges and solutions needed in C:\instructor

## Delegate prerequisites

Required: experience of either of UNIX or Windows environments. The delegates should be familiar with any high-level language – which does not include HTML or SQL. The course spends minimal time on first principles and delegates that don’t have a programming past struggle.

## Course Format and Approach

The course format follows the standard, with a title slide, content, then finishing on a summary slide.

Additional slides often follow the summary, these cover obscure aspects, or some common pitfalls. I suggest you mention these to delegates and use them as back-up to answer questions.

The Appendices do not necessarily follow this format, and represent additional material which may be referred to, or even taught if there is sufficient time and interest. There are no labs for material in the Appendices.

The practical sessions can have a lot of time allocated. Currently the course is a four-day event, with plenty of time to explore areas of interest to the delegates.

During classes that run longer, particularly in bootcamp or bespoke deliveries, there is a file of challenges which should be used as exploratory time at the end of any day. Delegates should be encouraged to attempt these challenges throughout the course.

## Timings

|  |  |
| --- | --- |
| Day 1 | |
| Time | Activity |
| 9:30 | JavaScriptIntroduction.pptx |
| 11:00 | Break |
| 11:15 | DG01\_Types.pptx + Lab 1 |
| 12:30 | Lunch |
| 13:30 | DG02\_Operators.pptx + Lab 2 |
| 15:00 | Break |
| 15:15 | DG03\_FlowOfControl.pptx – Up to IF and Labs (Challenge if needed) |
| 16:30 | End of Day |

|  |  |
| --- | --- |
| Day 2 | |
| Time | Activity |
| 9:30 | DG03\_FlowOfControl.pptx – While/For + Lab  DG04\_ErrorHandling.pptx (No Lab)  DG05\_Arrays.pptx |
| 11:00 | Break |
| 11:15 | DG05\_Arrays.pptx - Labs 5  DG06\_Functions.pptx – Up to rest argument (…args) |
| 12:30 | Lunch |
| 13:30 | DG06\_Functions.pptx (Scope) + Lab 6 (25 minutes)  DG07\_Collections.pptx + Lab 7 (15 minutes) |
| 15:00 | Break |
| 15:15 | DG08\_Objects.pptx + Lab 8 |
| 16:30 | End of Day |

|  |  |
| --- | --- |
| Day 3 | |
| Time | Activity |
| 9:30 | DG09\_JavaScriptAndDOM.pptx + Lab 9 |
| 11:00 | Break |
| 11:15 | DG10\_JavaScriptManipulatingStyles.pptx + Lab 10 |
| 12:30 | Lunch |
| 13:30 | DG11\_JavaScriptEvents.pptx + Lab 11 |
| 15:00 | Break |
| 15:15 | DG12+JavaScriptAndForms.pptx + Lab 12 |
| 16:30 | End of Day |

Continued….

|  |  |
| --- | --- |
| Day 4 | |
| Time | Activity |
| 9:30 | DG13\_JavaScriptModules.pptx + Lab 13  DG14\_ObjectOrientedJavaScript.pptx (No Lab) |
| 11:00 | Break |
| 11:15 | DG15\_ModernDevEnvironment.pptx + Lab 15 |
| 12:30 | Lunch |
| 13:30 | DG16\_AsynchronousJavaScript.pptx |
| 15:00 | Break |
| 15:15 | Lab 16 – or any other labs of their choice |
| 16:30 | End of Day |

# Chapter Summary

## Common introduction

You may wish to display the course contents, and briefly walk through the subjects covered. You may also wish to introduce the course materials, and the three manuals. Now is a good time for personal introductions, and to check prerequisites. It helps to get the delegates to state the operating system they use.

## 0. JavaScript Introduction

## Content

A very brief history

EMCA – The browser Standard

What can JavaScript do?

Key JavaScript concepts

Adding script to HTML

Noscript element

Comments

VSCode walkthrough and Chrome Devtools

#### **Labs**

There is no lab for this section

## 1. JavaScript Types

**Content**

Declaring variables

Primitive and Object types

typeof operator

undefined type

null

Number type

String type

Boolean type

String concatenation and interpolation

**Labs**

## The purpose of these labs is to understand how data types work in JavaScript.

## 2. Operators

**Content**

Assignment and Arithmetic

Relational and Boolean

Type checking

Checking for equality and type

Type conversion

**Labs.**

## The purpose of these labs is to understand how data can be manipulated by comparison and mathematical operators in JavaScript.

## 3. Flow Control

**Content**

IF statements

Ternary IF

Switch statement

While loop

For loop

**Labs**

The purpose of this lab is to understand how to use looping patterns in JavaScript and control the flow of data through the programs

### 4. Error Handling

**Content**

When things go wrong

The Error object

Try, catch and finally

Throwing exceptions

Debugging

**Labs**

There is no lab associated with this unit

5. Arrays

**Content**

Creating Arrays

Accessing Arrays

Array object methods

Pop and push

Shift and unshift

New Methods

For…of loop

**Labs**

The purpose of this lab is to create, modify and access content in JavaScript array structures

6. Functions

**Content**

Creating functions

Calling functions

Arrow functions

Default and rest parameters

Scope

Local Vs global scope

Global object

**Labs**

The purpose of this lab is to create functions and call them from JavaScript.

## 7. Collections

**Content**

Maps

Maps - iterating

Sets

Sets – iterating

Weaksets and weakmaps

**Labs**

The purpose of this lab is to translate data in JavaScript into the different methods of storing the data

## 

## 8. Objects

**Content**

Objects – Data structures

Accessing properties

Literal notation

Objects and arrays

Enhanced object literals

Object assignment

De-structuring arrays and objects

**Labs**

The purpose of this lab is to understand how to declare and de-structure objects

## 9. JavaScript and the DOM

**Content**

What is the Document Object Model

HTML markup to DOM object

Selecting elements

Basic selectors

Child container and attribute selectors

Selecting by position

Creating new content

InnerHTML and textContext

**Labs**

## The purpose of these labs is to manipulate the DOM by creating and adding new content

## 10. Manipulating Styles

**Content**

The style object

Reading CSS properties

Setting multiple CSS properties

CSS classes and JavaScript

Obtaining the calculated style of an object

Adding and removing classes

**Labs**

The purpose of this lab is to examine and manipulate CSS styles using JavaScript

## 11. JavaScript Events

**Content**

Understanding JavaScript events

The JavaScript event model

Inline subscription model

Simple event registration model

Event listener registration model

Using addEventListener

Debugging event listeners

Anonymous functions and addEventListener

Event bubbling Vs capturing

Removing event listeners

The event object

The this keyword  
Arrow functions  
Arrow functions Vs anonymous functions

Labs

The purpose of this lab is to be able to add and remove JavaScript events with a variety of functions 12. JavaScript and Forms

Content

Understanding forms

HTML form inputs

Elements

Required fields

Patterns

Form validation

HTML hierarchy

Selecting form elements

Accessing input elements

Radio buttons

Accessing Select options

Form methods and events

Form submission

Form events

Input element events

The submit event

Field validation

Regular Expresions

Labs

The purpose of this lab is to create validations for HTML forms using JavaScript and to disrupt the normal and expected behaviour of webforms.

13. Modules

**Content**

Exporting and importing

Importing many functions

Default exports and imports

Labs

The purpose of this lab is to adapt monolith code into microservice style modules.

14. Object Oriented JavaScript

**Content**

Objects recap

Classes

Accessing Properties

Inheritance

Classes – Static methods

Sealing Objects

Labs

The purpose of this lab is to understand how to create objects and inherit behaviours

15. Modern Development Environment

**Content**

Node and NPM

Webpack

Core-JS

Labs

The purpose of this lab is to use NPM to install the required dependencies to build a distribution of your software

16. Asynchronous JavaScript

**Content**

What is asynchronous JavaScript

4 principles

Client centric development model

Server centric development model

JSON

JSON structures

JSON and JavaScript

The JSON object

RESTful services

Mocking a RESTful service

Promises

Fetch

Async functions

Async / await

Labs

The purpose of this lab is to build a simple mock RESTful SPA