



## Module 1 – Introduction to C#

3 weeks

- Employer induction and familiarisation
- Pre-reading: Introduction to C#
- Microsoft Virtual Academy

## Module 2 – Bootcamp

3 weeks

- Writing C# code
- Using the Visual Studio development environment
- Using Git for version control
- Writing object oriented design
- Writing clean code
- Unit testing
- Debugging and problem solving skills working with files
- Working with HTTP

## Module 3 – Further C#

8 weeks

- Object Oriented Programming
- Numbers, Dates and Times
- Generics
- Strings
- Delegates, Events and Lambdas
- Functional Programming LINQ
- Equality, Comparison and Operator Overloading
- Introduction to Multithreaded and Asynchronous Programming

## Module 4 – Data structure & algorithms

3 weeks

- Algorithmic Complexity
- Sorting Algorithms
- Searching Algorithms
- Lists and Queues
- Dictionaries and Sets

## Module 5 – Web development

10 weeks

- HTML
- CSS
- SASS
- JavaScript
- Principles of User Experience (UX)
- Accessibility
- Responsive Design
- Security

## Module 6 – Principles of clean Code

4 weeks

- DRY (Don't Repeat Yourself)
- YAGNI (You Ain't Gonna Need It)
- The SOLID principles of Object Oriented Design
- Separation of Concerns
- Principle of Least Surprise
- Levels of Abstraction

## Module 7 – Databases

8 weeks

- Tables, Relationships & Database Design
- Reading & Writing Data Using SQL
- Aggregates, Joins & Subqueries
- Datatypes and Null Values
- Locks and Transactions
- ORMs and Migrations
- Indexes and Performance Considerations

## Module 8 – Testing

8 weeks

- Levels of Testing (unit, integration, system, etc.)
- Types of Testing (functional, performance, security, etc.)
- Styles of Testing (test-driven, exploratory, etc.)
- Dependency Injection and Test Doubles
- User Interface Testing Techniques
- Test Metrics (coverage targets, etc.)
- The Testing Mindset

## Module 9 – Engineering Camp

2 weeks

- Software development methodologies
- Seven stages of the Software Development
  - Lifecycle Software development methodologies (waterfall vs agile)
  - Team structure and project management

## Module 10 – Advanced C#

10 weeks

The Advanced C# course is designed to prepare apprentices for the Microsoft Certified Professional exam "Programming in C#", and consists of a 10-week series of weekly learning guides, practice exercises and facilitated discussion sessions following the current syllabus of that exam.

## Module 11 – Project Engineering Skills

10 weeks

This Project Engineering Skills module is designed to prepare apprentices for the End Point Assessment exam, which will be a one week assessed project involving building a complete software solution from requirements through to implementation. The primary focus of this module is on practice papers supported by group discussion, with additional material tailored to individual student requirements.