

**Module 1 – Introduction to Java** **3 weeks**

- Employer
- Induction and familiarisation
- Pre-reading: Introduction to Java Online training resources

**Module 2 – Bootcamp** **3 weeks**

- Writing Java code
- Using the IntelliJ
- Using Git for version control
- Object oriented design
- Writing clean code
- Unit testing
- Debugging and problem solving skills
- Working with files
- Working with HTTP
- Using Maven
- Common libraries and the Java ecosystem

**Module 3 – Further Java** **8 weeks**

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

**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
- Framework options

**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 and Database Design
- Reading and Writing Data Using SQL
- Aggregates, Joins and 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 Java** **10 weeks**

The Advanced Java course is designed to prepare apprentices for an Oracle Java Programmer accreditation, and consists of practice exercises and facilitated discussion sessions following the current syllabus of that exam.

**Module 11 – Project Engineering Skills** **10 weeks**

The 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 the course is on practice papers supported by group discussion.