Programming in Scala
Duration: 3 days (9 hours each day with working lunch)

Scala being a concise, functional, object-oriented language on the Java Virtual Machine has some remarkable features. It's expressive, fully OO, integrates well with Java and Java libraries, has good support for functional style, has wonderful and powerful static typing, has low ceremony, and is great to create performing code. This course will dive into the essential parts of Scala, what programmers interested in developing applications should minimally know, but in good depth.

The course has a good balance of interactive lectures and hands-on exercises. The attendees are expected to pair-up and work on the lab exercises. The instructor will assist the attendees as they work on the labs. The objective of the course is for the attendees to gain an in depth practical knowledge of the concepts so they can put them to immediate use on their real projects.

The course content will be customized to meet your teams' specific needs. Please review this detailed outline and suggest changes (additions, deletions, modifications) as you feel fit.

Topics

Exploring Scala
* What's Scala and Why?
* Scala scripts and classes
* Ways to run Scala code
* Sensible defaults
* val vs var
* data types and tuples
* Scala types to Java types mapping
* Creating functions
* Higher order functions
* setImperative vs. Functional style
* Exception Handling
* Exercise

OOP The Scala Way
* pure object-oriented programming
* conciseness and design elegance
* standalone and companion Objects
* Scala singletons
* accessors

* apply() and update() methods
* Creating parametrized types
* Using parametrized types
* Variance on parametrized types
* Exercise

Functional Programming
* immutability
* What's functional programming?
* higher order functions
* imperative and functional styles of Scala
* closures and function values
* Partially applied functions
* patterns with closures
* Exercise

Scala Idioms
* operators, precedence, and overloading
* type inference and sensible typing
* traits
* Decorating with traits
* implicit conversions
* value classes
* Exercise

Scala Collections
* Scala's collection library
* immutable and mutable collections
* Lists, sets, and maps
* working with collections
* Exercise

Intermixing with Java
* compiling to bytecode
* calling Java from Scala
* calling Scala from Java
* Implementing Java interfaces
* exception handling
* Exercise

Unit Testing
* Using JUnit
* Using ScalaTest
* Asserts and expect
* Before and after
* Functional Style testing

* Using ScalaTest with JUnit
* Exercise

Pattern Matching and Regular Expressions
* Powerful pattern matching
* matching literals, tuples, and data types
* case classes
* extractors
* regular expressions as extractors
* Exercise

Application Development
* accessing files and databases
* working with XML
* creating GUI
* writing web applications
* Parser Combinators
* Using Parser Combinators
* Exercise

Concurrent Programming
* problem with locks
* immutability
* actors
* message passing
* creating concurrent applications
* Exercise

About the Instructor

Dr. Venkat Subramaniam is an award-winning author, founder of Agile Developer, Inc., creator of agilelearner.com, and an instructional professor at the University of Houston.

He has trained and mentored thousands of software developers in the US, Canada, Europe, and Asia, and is a regularly-invited speaker at several international conferences. Venkat helps his clients effectively apply and succeed with sustainable agile practices on their software projects.

Venkat is a (co)author of multiple technical books, including the 2007 Jolt Productivity award winning book Practices of an Agile Developer. You can find a list of his books at agiledeveloper.com. You may read more about Venkat and Agile Developer, Inc. at http://agiledeveloper.com.