

□ **ADVANCED LEVEL – Architecture & Systems**

Audience: Senior engineers, architects

Goal: Scalable, maintainable Kotlin systems

Module 17: Advanced Coroutines & Flow

- Coroutine lifecycle
 - Channels vs Flow
 - Backpressure
 - Cancellation
 - Concurrency patterns
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Module 18: Memory, JVM & Performance

- JVM memory model
 - Stack vs heap
 - Garbage collection
 - Kotlin performance tips
 - Profiling basics
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Module 19: Design Patterns in Kotlin

- Singleton (Kotlin way)
 - Factory
 - Strategy
 - Observer
 - Avoiding Java-pattern misuse
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Module 20: Architecture & Code Organization

- Clean architecture in Kotlin
- Layered vs feature-based design
- Dependency injection concepts
- Configuration-driven systems

Module 21: Testing & Quality

- Unit testing (JUnit)
- Mocking (MockK)
- Parameterized tests
- Code coverage
- Quality mindset

Module 22: Security

- Secure coding practices
- Input validation
- Authentication basics
- Authorization patterns
- OWASP overview

Module 23: DevOps & Deployment

- Building Kotlin/JVM apps
- Packaging & JARs
- Dockerizing Kotlin apps
- Environment configs
- Logging & monitoring