KOENIG
step forward

KOENIG SOLUTIONS · COURSE OUTLINE

Advanced PHP: OOP, Doctrine ORM & REST APIs

Learn to apply advanced PHP, OOP design patterns, Doctrine ORM and REST APIs to build, secure and deploy web applications.

5 Days	47	15
DURATION	TOPICS	HANDS-ON ACTIVITIES

COURSE OVERVIEW

This course covers advanced PHP 7 and 8 features, custom error handling, and regular expressions alongside coding standards and refactoring techniques. It then examines in-depth object-oriented programming, including traits, design patterns, dependency injection and the Reflection API. Database interaction follows, covering complex SQL, Doctrine ORM, caching strategies and NoSQL integration with MongoDB, before moving to building RESTful and GraphQL APIs, asynchronous programming with ReactPHP and Swoole, and real-time applications with WebSockets. The final module addresses application security, testing with PHPUnit, CI/CD pipelines, and performance profiling and optimisation.

WHO THIS COURSE IS FOR

- **PHP Developers**
- **Backend Developers**
- **Software Engineers**
- **API Developers**
- **Web Application Developers**

PREREQUISITES

- Strong Knowledge of PHP Programming

LEARNING OBJECTIVES

- Apply PHP 7 and 8 features such as match expressions and union types
- Implement custom error handlers and structured exception hierarchies
- Apply SOLID design principles and code refactoring techniques
- Implement design patterns such as Singleton, Factory and Observer
- Build a dependency injection container and use the Reflection API
- Develop and optimise database interactions using Doctrine ORM
- Build RESTful and GraphQL APIs with real-time WebSocket features
- Configure CI/CD pipelines and profile application performance

COURSE SYLLABUS

47 Topics

DAY 1 Advanced PHP Features and Best Practices

TOPICS

3 Activities

- PHP 7+ new features overview (e.g., anonymous classes, scalar type declarations, return type declarations)
- PHP 8 new features (e.g., match expressions, JIT compiler, union types, named arguments)
- Custom error handlers
- Exception hierarchy and best practices
- Handling fatal errors and shutdown functions
- Advanced pattern matching
- Lookaheads and lookbehinds
- Complex validation examples
- Coding standards and PSR guidelines
- Design principles (SOLID)
- Code refactoring techniques

DAY 2 In-Depth Object-Oriented Programming (OOP)

TOPICS

3 Activities

- Traits and late static bindings
- Namespaces and autoloading
- Abstract classes and interfaces
- Singleton, Factory, Strategy, and Observer patterns
- Practical implementation of design patterns
- Principles of dependency injection
- Creating and using a dependency injection container
- Using the Reflection API
- Dynamically invoking classes and methods
- Analyzing and modifying classes at runtime

DAY 3 Advanced Database Interaction and ORM

TOPICS

3 Activities

- Writing complex SQL queries
- Transactions, indexing, and query optimization
- Advanced relationships and mappings
- Using Doctrine migrations
- Optimizing database queries with Doctrine
- Implementing caching strategies (e.g., Redis, Memcached)
- Introduction to NoSQL databases
- Integrating MongoDB with PHP

DAY 4 Web Services, APIs, and Asynchronous PHP

TOPICS

3 Activities

- Building RESTful APIs with Laravel/Lumen
- Implementing GraphQL APIs
- Advanced cURL techniques
- Handling API rate limiting and errors
- Introduction to asynchronous programming
- Using ReactPHP and Swoole for async tasks
- Implementing WebSockets with Ratchet
- Building real-time applications

DAY 5 Security, Testing, and Deployment

TOPICS

3 Activities

- Advanced techniques for preventing SQL injection, XSS, CSRF
- Securing APIs and handling authentication/authorization
- Writing unit tests with PHPUnit
- Mocking and stubbing dependencies
- Test-driven development principles
- Setting up CI/CD pipelines with Jenkins/GitHub Actions
- Automating testing and deployment processes
- Profiling PHP applications with Xdebug and Blackfire
- Code optimization techniques
- Implementing advanced caching strategies

HANDS-ON ACTIVITIES

Practise What You Learn

MODULE	ACTIVITY
Advanced PHP Features and Best Practices	**LAB 1: IMPLEMENTING ADVANCED FEATURES** ■ Utilizing new PHP 7+ and 8 features in a sample project ■ Creating custom error handlers and handling complex exceptions ■ Writing complex regular expressions for data validation
In-Depth Object-Oriented Programming (OOP)	**LAB 2: ADVANCED OOP AND DESIGN PATTERNS** ■ Implementing and using traits and late static bindings in a project ■ Applying design patterns to solve real-world problems ■ Creating a dependency injection container and using reflection
Advanced Database Interaction and ORM	**LAB 3: ADVANCED DATABASE OPERATIONS** ■ Writing and optimizing complex SQL queries ■ Using Doctrine for advanced ORM operations ■ Implementing caching and using a NoSQL database
Web Services, APIs, and Asynchronous PHP	**LAB 4: BUILDING AND CONSUMING APIS** ■ Developing a RESTful API with advanced features ■ Consuming and handling external APIs ■ Creating a real-time application with WebSockets

MODULE	ACTIVITY
Security, Testing, and Deployment	**LAB 5: FINAL PROJECT AND BEST PRACTICES** ■ Integrating security features in a web application ■ Writing and running comprehensive tests ■ Setting up a CI/CD pipeline and optimizing performance

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training | Live Online Classes (ILO) | Fly-Me-A-Trainer (FMAT) | Flexi (Self-Paced) | 1-on-1 Training

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Talk to a learning advisor about schedules, group training and customised delivery.

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