



(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)

S.P.G.Chidambara Nadar - C.Nagammal Campus  
S.P.G.C. Nagar, K.Vellakulam – 625 701 (Near VIRUDHUNAGAR).

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Industry Certified Value Added Course on

### “Modern Java Application Development Using Spring Boot”

05-01-2026 to 10-01-2026 (2025 – 2026 EVEN)

#### COURSE OBJECTIVES

- To understand and apply fundamental Object-Oriented Programming concepts using core Java constructs.
- To implement key OOP principles such as encapsulation, inheritance, polymorphism, and abstraction for modular software design.
- To analyze and apply object-oriented design principles, including SOLID principles, to develop loosely coupled and maintainable applications.
- To configure and manage dependencies and beans using Spring Framework concepts such as Inversion of Control and Dependency Injection.
- To design and develop Spring Boot applications using Spring Initializr, auto-configuration, embedded servers, and starter dependencies through a mini project.

#### UNIT 1 : OBJECT ORIENTED PROGRAMMING & CORE JAVA (10 Hours) BASICS

Introduction to Object-Oriented Programming concepts. Java Fundamentals: Class and Object creation. Constructors and constructor overloading. Java Keywords: this keyword for current object reference, static keyword for class-level members. Methods: Method Overloading and Method Overriding. Hands-on exercises on class design, object instantiation, and method implementation.

#### UNIT 2 : CORE OOPS PRINCIPLES & PACKAGE MANAGEMENT (10 Hours)

OOP Principles: Encapsulation – data hiding using private fields and public methods. Polymorphism – method overriding and runtime behavior. Inheritance – code reusability using extends. Abstraction – hiding implementation using abstract classes. Java Fundamentals: super keyword for parent class reference. Access Modifiers: private, default, protected, public. Packages: Creating and organizing packages. Importance of package structure in large-scale applications. Hands-on problem solving using OOP concepts.

#### UNIT 3 : ADVANCED OOPS & DESIGN THINKING (10 Hours)

Interfaces vs Abstract Classes: Usage scenarios and design considerations. Coupling Concepts: Tight coupling and its limitations; Loose coupling for Spring-oriented design. Dependency Concept: Definition of dependency and importance of dependency management. SOLID Principles (Introduction): Single Responsibility Principle (SRP). Open/Closed Principle (OCP). Dependency Inversion Principle (DIP). Composition vs Inheritance: Has-A vs Is-A relationships with real-world examples. Design-based problem solving and refactoring exercises.

**UNIT 4 : SPRING FRAMEWORK CORE CONCEPTS (10 Hours)**

Introduction to Spring Framework: Need for Spring, limitations of traditional Java applications, and enterprise benefits. Core Spring Concepts: Inversion of Control (IoC), Dependency Injection (DI), advantages of IoC and DI. Types of Dependency Injection: Constructor Injection and Setter Injection. Spring Beans: Definition, bean lifecycle overview, bean scopes – Singleton and Prototype. Java-Based Configuration: @Configuration, @Bean. Hands-on practice on Spring bean configuration and dependency injection.

**UNIT 5 : SPRING BOOT FUNDAMENTALS & MINI PROJECT (10 Hours)**

Introduction to Spring Boot: Features and advantages of Spring Boot. Spring Framework vs Spring Boot: Configuration differences and dependency management. Project Setup: Spring Initializr and Spring Boot project structure. Core Annotation: @SpringBootApplication. Configuration Management: application.properties, server port configuration. Server & Dependencies: Embedded Tomcat server, starter dependencies (spring-boot-starter-web, etc.). Mini Project: Development of a basic Spring Boot application.

**Total: 50 Hours**

**COURSE OUTCOMES**

After successful completion of the course, the students will be able to

<b>CO. No.</b>	<b>Course Outcome</b>	<b>Knowledge Level</b>
CO1	Implement core Java fundamentals and Object-Oriented Programming concepts to create classes, objects, constructors, and methods.	K3 - Apply
CO2	Demonstrate the use of OOP principles such as encapsulation, inheritance, polymorphism, and abstraction in developing modular Java applications.	K3 - Apply
CO3	Construct object-oriented designs using interfaces, abstraction, composition, and SOLID principles to achieve loose coupling and maintainability.	K3 - Apply
CO4	Develop and execute dependency injection and bean management using Spring Framework concepts such as Inversion of Control and Java-based configuration.	K3 - Apply
CO5	Develop a Spring Boot application by utilizing Spring Initializr, auto-configuration, embedded servers, and starter dependencies through a mini project.	K3 - Apply

## PROGRAMME SPECIFIC OUTCOMES (PSOs):

### PSO1:

**Professional Skills:** The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

### PSO2:

**Problem - Solving Skills:** The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

### CO - PO MAPPING

Course Name	CO. No.	POs											PSOs	
		1	2	3	4	5	6	7	8	9	10	11	1	2
Modern Java Application Development Using Spring Boot	CO1	H	M	L	L	M	L	-	-	-	M	M	H	M
	CO2	H	M	L	L	M	L	-	-	-	M	M	H	M
	CO3	H	M	H	M	M	M	-	M	L	M	M	M	H
	CO4	H	M	H	M	M	M	-	M	L	H	M	M	H
	CO5	H	M	H	M	M	M	-	M	L	H	M	H	H

H - High, M - Moderate, L - Low

### SDG MAPPING

Modern Java Application Development Using Spring Boot	SDGs																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
				✓				✓	✓								

*Venkatesh*  
KVP  
**Trainer**

Mr.S.Venkatesh,  
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*J John*  
**VAC Course Incharges**

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