KAMARAJ COLLEGE OF ENGINEERING & TECHNOLOGY
(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 ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Value Added Course on "Spring Boot – Java Framework"

Syllabus

45 HOURS

Course Objectives

- To understand the fundamental concepts of Java Spring Boot and its architecture.
- To learn how to develop web applications using Spring Boot and its modules.
- To gain knowledge in configuring, deploying, and securing Spring Boot applications.
- To explore data management using Spring Data JPA and database integration.
- To implement RESTful APIs and microservices using Spring Boot.
- To apply Spring Boot in real-time projects for web and enterprise applications.

UNIT 1: INTRODUCTION TO JAVA & ARCHITECTURE (9)

Understand Java and set up a Memory Allocation- Foundations of Java such as Java syntax, variables, data types, and operators. - Discuss about JDK, JVM, JRE. - Understand and apply object-oriented programming (OOP) concepts: classes, objects, and inheritance. - Create and use Constructors for modular programming. Instal JDK 21 and IDE Tool Test run Java programs.

UNIT 2: INTRODUCTION TO SPRING BOOT (9)

Introduction to Java Frameworks – Overview of Spring Framework – Understanding Spring Boot – Features and Benefits – Spring Boot vs Traditional Spring – Spring Boot Installation and Setup – Introduction to Spring Initializr – Creating a Basic Spring Boot Application – Project Structure – Running Spring Boot Applications.

UNIT 3: SPRING BOOT CORE CONCEPTS (8)

Spring Boot Auto Configuration – Dependency Injection – Beans and Components – Spring Boot Annotations – Application Properties – Configuration Management – Profiles and Environment – Logging with Spring Boot – Exception Handling – Introduction to Spring Boot Starters.

UNIT 4: DATA MANAGEMENT WITH SPRING BOOT (7)

Spring Boot with JDBC – Spring Data JPA – ORM with Hibernate – CRUD Operations – Repository and Service Layers – Transactions and Entity Relationships – Database Connectivity (MySQL, PostgreSQL, MongoDB) – Pagination and Sorting – Error Handling in Data Layer – Ideas related to projects in Data Management.

UNIT 5: BUILDING RESTFUL APIS and PROJECT IMPLEMENTATION (12)

Introduction to RESTful Services – Building REST APIs using Spring Boot – HTTP Methods (GET, POST, PUT, DELETE) – Request and Response Handling – Path Variables and Request Parameters – Introduction to Microservices – API Gateway – Service Registration and Discovery (Eureka) – Inter-Service Communication – Resilience and Fault Tolerance – REST API Testing using Postman.

Project Deployment – Presentation and Evaluation – Discussion and Doubt Clearing – Final Assessment.

Course Outcomes:

At the end of the course, students will be able to:

- CO1: Explain the core concepts and architecture of Spring Boot.
- CO2: Develop web applications and RESTful APIs using Spring Boot.
- CO3: Integrate databases and perform CRUD operations with Spring Data JPA.
- CO4: Implement security mechanisms and deploy Spring Boot applications in cloud environments.
- CO5: Build and present real-time projects using Spring Boot and related technologies.