Advanced Generative AI Development on AWS Training

Duration: **3 Day**

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Overview

The **Advanced Generative AI Development on AWS** course is an intensive three-day instructor-led programme designed for experienced developers who want to build production-ready generative AI applications using AWS services. It focuses on helping organisations move beyond experimentation and successfully deploy enterprise-grade AI solutions that align with strategic business objectives.

Participants will gain practical experience across the complete generative AI development lifecycle, from selecting and deploying foundation models to integrating AI capabilities into enterprise environments. The course explores advanced topics including multimodal data processing, Retrieval-Augmented Generation (RAG), vector databases, prompt engineering, governance, autonomous AI agents, AI security, performance optimisation, monitoring, testing, and operational best practices.

Following AWS's recommended adoption framework, the programme guides learners through the journey from proof-of-concept projects to scalable, secure, and production-ready AI implementations.

This course includes practical use of the following AWS services:

- Amazon Bedrock
- Amazon OpenSearch Service

Prerequisites

Participants are recommended to have:

- Completed **AWS Technical Essentials** or possess equivalent AWS knowledge
- Completed **Generative AI Essentials on AWS** or have comparable experience
- At least two years of experience developing production applications on AWS or using open-source technologies
- General experience with artificial intelligence, machine learning, or data engineering
- Approximately one year of hands-on experience implementing generative AI solutions

Who Should Attend

This course is intended for:

- Software developers
- Software engineers
- Cloud application developers
- Technical professionals
- AI solution developers
- Engineering teams building generative AI applications on AWS

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What You Will Learn

By the end of this course, learners will be able to:

- Develop enterprise-ready generative AI applications using AWS services that meet security, scalability, and reliability requirements.
- Evaluate and select the most appropriate foundation models for different business scenarios.
- Design highly available and resilient foundation model architectures.
- Build advanced data processing pipelines for multimodal AI applications.
- Implement Retrieval-Augmented Generation (RAG) solutions using Amazon Bedrock Knowledge Bases and Amazon OpenSearch Service.
- Design enterprise prompt engineering frameworks and governance processes.
- Develop autonomous AI agents using Amazon Bedrock AgentCore.
- Apply AI safety, security, and responsible AI practices throughout application development.
- Optimise AI application performance while controlling infrastructure and inference costs.
- Implement monitoring, observability, testing, and validation strategies for production AI systems.
- Integrate generative AI applications into enterprise environments using secure and scalable architectural patterns.

Outline

Module 1: Foundation Model Selection and Configuration

- Comparing foundation models
- Model evaluation criteria
- Performance benchmarking
- Model configuration techniques
- Enterprise deployment considerations

Module 2: Advanced Data Processing for Foundation Models

- Data preparation workflows
- Processing multimodal data
- Data validation techniques
- Performance optimisation for AI data pipelines

Module 3: Vector Databases and Retrieval-Augmented Generation

- Vector database architecture
- Amazon Bedrock Knowledge Bases
- Amazon OpenSearch Service
- Hybrid retrieval strategies
- Retrieval optimisation techniques

Hands-on Lab

Develop Retrieval-Augmented Generation (RAG) applications using Amazon Bedrock Knowledge Bases

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Module 4: Prompt Engineering and Prompt Governance

- Advanced prompt engineering techniques
- Prompt lifecycle management
- Enterprise prompt governance
- Chain-of-Thought prompting strategies

Hands-on Lab

Develop advanced conversational workflows using Amazon Bedrock APIs

Module 5: Building Agentic AI Solutions with Amazon Bedrock AgentCore

- Agent architecture
- Autonomous AI agents
- Tool integration
- Multi-step reasoning workflows

Module 6: AI Safety and Security

- AI security architecture
- Content filtering
- Privacy protection
- Security controls
- Adversarial testing
- Responsible AI implementation

Hands-on Lab

Build secure and responsible generative AI applications using Amazon Bedrock Guardrails

Module 7: Performance Optimisation and Cost Management

- Token optimisation strategies
- Batch processing techniques
- Intelligent caching
- Performance tuning
- AWS cost optimisation practices

Module 8: Monitoring and Observability for Generative AI

- Monitoring AI applications
- Performance metrics
- Logging strategies
- Observability best practices
- Operational monitoring

Module 9: Testing, Validation, and Continuous Improvement

- AI testing methodologies
- Model validation
- Quality assurance frameworks

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- Continuous evaluation
- Performance analysis

Module 10: Enterprise Integration Patterns

- Enterprise integration architectures
- Secure AI integration approaches
- Scalable deployment strategies
- Compliance considerations
- Integrating AI with microservices and enterprise platforms

Module 11: Course Review and Wrap-up

- Review of key concepts
- Best practices
- Architecture recommendations
- Final discussion and Q&A session

Hands-On Learning

Throughout the course, participants will:

- Complete instructor-led demonstrations.
- Perform practical labs using Amazon Bedrock.
- Build Retrieval-Augmented Generation (RAG) solutions.
- Develop autonomous AI agents.
- Work through realistic enterprise implementation scenarios.
- Participate in collaborative discussions and technical workshops.

Examination and Assessment

This course supports preparation for the:

AWS Certified Generative AI Developer – Professional (AIP-C01) certification.

The curriculum reinforces the knowledge and practical skills required to succeed in the certification exam and implement production-ready generative AI solutions using AWS.