AI Infrastructure and Operations Fundamentals

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Paris (France)

UK Traininig
PARTNER



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Introduction

Artificial Intelligence AI depends on a powerful, scalable, and secure infrastructure that can support intensive computational workloads and continuous innovation.

As organizations expand their use of AI technologies, understanding how to build and manage AI infrastructure becomes a critical competency for operational success.

This course provides a comprehensive foundation in AI infrastructure and operations, covering architecture design, data pipelines, compute environments, and security management.

Participants will learn to design, implement, and optimize AI systems that align with enterprise IT strategies, ensuring reliability, scalability, and efficiency across all stages of the AI lifecycle.

Through practical examples and industry frameworks, the course empowers professionals to establish a sustainable AI environment capable of supporting advanced analytics, machine learning, and real-time decision systems.

Course Objectives

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

- Understand the core components of AI infrastructure, including compute resources, data pipelines, storage systems, and networking.
- Design scalable and cost-optimized AI environments using cloud, on-premises, and hybrid architectures.
- Implement MLOps practices for model deployment, monitoring, and lifecycle automation.
- Integrate AI governance, compliance, and security frameworks within operational workflows.
- Enhance system reliability and optimize performance for large-scale AI workloads.
- Foster collaboration between data science, IT, and DevOps teams for seamless AI operations.



Course Outlines

Day 1: Foundations of AI Infrastructure

- Introduction to AI system architecture and operational models.
- Components of AI infrastructure: compute, data, storage, and networking.
- Comparison of cloud, on-premises, and hybrid deployment models.
- Role of GPUs, TPUs, and emerging AI hardware technologies.
- Infrastructure scalability and redundancy best practices.
- Workshop: Designing an AI infrastructure blueprint.

Day 2: Data Pipelines and Processing Frameworks

- Building robust data pipelines to support AI and machine learning.
- Data ingestion, preprocessing, and transformation workflows.
- Managing data quality, versioning, and lineage across the AI lifecycle.
- Tools and frameworks: Apache Spark, Kafka, and TensorFlow Extended TFX.
- Integrating data management with AI model development.
- Case study: Building an automated data ingestion pipeline for AI systems.

Day 3: MLOps and AI Deployment Strategies

- Understanding MLOps frameworks and CI/CD pipelines for AI.
- Automating model training, testing, and deployment in production.
- Implementing model versioning, monitoring, and rollback strategies.
- Using containerization and orchestration tools like Docker and Kubernetes.
- Best practices for maintaining model performance in production environments.
- Case study: End-to-end deployment of a machine learning model with Kubernetes.

Day 4: AI Security, Governance, and Compliance

- Managing security challenges in AI infrastructure and data pipelines.
- Data encryption, privacy, and compliance with regulatory standards ISO, GDPR.
- Establishing AI observability and audit frameworks.
- Integrating responsible AI principles and ethical considerations in operations.
- Risk management and incident response in AI systems.
- Workshop: Designing a secure AI governance framework.



Day 5: Performance Optimization and Scalability

- Resource orchestration and workload distribution using Kubernetes.
- Implementing auto-scaling and cost optimization in cloud-based AI infrastructure.
- Benchmarking and performance tuning for high-demand AI applications.
- Monitoring tools and performance dashboards for AI systems.
- Building a resilient, future-ready AI infrastructure to support organizational growth.
- Group project: Developing a performance and scalability improvement plan.

Why Attend This Course: Wins & Losses!

- Gain a complete understanding of AI infrastructure and operations from design to deployment.
- Master MLOps methodologies to streamline AI lifecycle management.
- Learn how to build scalable, cost-efficient, and secure AI environments.
- Strengthen collaboration between technical and business teams through shared AI operations frameworks.
- Enhance data governance and regulatory compliance within AI ecosystems.
- Acquire practical skills for optimizing compute performance and cost efficiency.
- Build a roadmap for future-proofing your organization's AI infrastructure.
- Improve your ability to lead enterprise-level AI transformation initiatives.

Conclusion

A robust and well-managed AI infrastructure is the foundation of every successful artificial intelligence strategy.This course provides the essential technical and operational understanding needed to design, optimize, and govern AI systems effectively.

By mastering the principles of AI infrastructure and operations, participants will be prepared to implement scalable, secure, and high-performance environments that accelerate innovation and support sustainable AI adoption. Through the integration of best practices, governance, and automation, professionals will emerge ready to lead the future of AI infrastructure management with confidence and expertise.

