

ARTIFICIAL INTELLIGENCE (AI) SYSTEMS ARCHITECTURE AND GOVERNANCE



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Introduction

Artificial Intelligence (AI) Systems Architecture and Governance Training Course prepares architects, engineers, and governance professionals to design AI systems that are both effective and accountable. Participants work through AI architecture patterns and components, data pipelines and feature engineering, model development, deployment, and serving infrastructure, MLOps and monitoring architecture, security and privacy architecture for AI, and governance controls including the NIST AI RMF, ISO/IEC 42001, and architecture decision records as one connected discipline. The programme links the architecture choices a team makes with the governance obligations those choices create. As a result, learners gain a practical command of AI architecture and governance. Furthermore, the course strengthens architectural judgement, control design, and AI systems literacy.

Artificial Intelligence (AI) Systems Architecture and Governance Course Objectives

- Explain AI system architecture patterns and component roles.
- Apply data pipeline, feature store, and data lineage architecture.
- Apply model development, training, and versioning architecture.
- Apply deployment patterns: batch, real-time, and edge serving.
- Apply MLOps, CI/CD for models, and monitoring architecture.
- Apply security, access, and privacy architecture for AI systems.
- Apply the NIST AI RMF and ISO/IEC 42001 to architecture decisions.
- Apply human oversight, escalation, and fallback architecture.
- Apply architecture decision records and model documentation.
- Apply AI observability, drift detection, and incident architecture.



Course Methodology

- Interactive sessions built on AI architecture and governance cases.
- Workshops on architecture patterns, data pipelines, and control layering.
- Group exercises on deployment design, observability, and governance mapping.
- Hands-on practice with architecture diagrams, ADRs, and control matrices.
- Simulation of an architecture review board and an AI incident diagnosis.
- Facilitator coaching and peer review on personal architecture plans.

Who Should Take This Course

- Enterprise and solution architects working on AI.
- ML engineers, MLOps engineers, and data engineers.
- Technology governance and architecture review staff.
- AI governance, risk, and compliance professionals.
- Information security and data protection architects.
- Consultants advising on AI architecture and governance.

Artificial Intelligence (AI) Systems Architecture and Governance Course Outlines

Day 1: AI Architecture Foundations

- AI system architecture patterns and reference designs.
- Components: data, features, models, serving, and interfaces.
- Batch, real-time, streaming, and edge architectures.
- Foundation model versus bespoke model architecture choices.

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- Build, buy, and partner architecture considerations.
- Architecture quality attributes: scalability, latency, reliability.
- Case discussion: an AI system that scaled well and governed nothing.

Day 2: Data Architecture and Lineage

- Data ingestion, storage, and processing architecture.
- Feature stores, feature engineering, and reuse.
- Data lineage, provenance, and versioning.
- Data quality, validation, and drift in inputs.
- Privacy architecture: minimisation, masking, and consent.
- Data retention, deletion, and records architecture.
- Workshop: designing a governed data pipeline for AI.

Day 3: Model, Deployment, and MLOps Architecture

- Model development, training, and experiment tracking.
- Model registry, versioning, and reproducibility.
- CI/CD for models and release governance.
- Serving patterns: online, batch, and event-driven inference.
- Fallback, degradation, and circuit-breaker design.
- Infrastructure, cost, and capacity architecture.
- Exercise: designing a deployment architecture with governance gates.

Day 4: Security, Oversight, and Control Architecture

- Security architecture: identity, access, and least privilege.
- Prompt, tool, and API access control architecture.



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- Logging, audit trails, and traceability by design.
- Human oversight, approval gates, and override architecture.
- NIST AI RMF and ISO/IEC 42001 mapped to architecture.
- Control layering across the AI technology stack.
- Simulation: reviewing architecture against control requirements.

Day 5: Observability, Governance, and Assurance

- Observability architecture: metrics, logs, and tracing.
- Drift detection, performance monitoring, and alerting.
- AI incident architecture and response pathways.
- Architecture decision records (ADRs) and documentation.
- Architecture review board and governance integration.
- Continuous improvement and architecture maturity.
- Capstone: presenting an AI systems architecture and governance blueprint.

Conclusion

By successfully completing Artificial Intelligence (AI) Systems Architecture and Governance, participants will gain a practical command of AI architecture patterns and components, data pipeline and lineage architecture, model deployment and MLOps architecture, security, oversight and control architecture, and observability, governance and assurance architecture. They will acquire skills in AI architecture design, data lineage governance, control layering, and observability design that make AI systems both effective and accountable. Gentex Training Center designs the programme to help professionals architect and govern AI systems with confidence.





FAQs for the Artificial Intelligence (AI) Systems Architecture and Governance course

Q1 What is the "Artificial Intelligence (AI) Systems Architecture and Governance" course about?

It prepares architects, engineers, and governance professionals to design AI systems that are both effective and accountable. The course spans AI architecture foundations, data architecture and lineage, model, deployment and MLOps architecture, security, oversight and control architecture, and observability, governance and assurance.

Q2 What are the key benefits of the "Artificial Intelligence (AI) Systems Architecture and Governance" course?

You gain a practical command of AI architecture and governance that links the architecture choices a team makes with the governance obligations those choices create. The course improves architecture pattern selection and data lineage design, strengthens MLOps and deployment governance, sharpens control layering and oversight architecture, and gives you observability and assurance design that keeps AI systems accountable.

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Q3 What skills will I gain from the "Artificial Intelligence (AI) Systems Architecture and Governance" course?

You will develop four core skills: AI system architecture design across data, model and serving layers, data pipeline and lineage architecture with privacy controls, deployment and MLOps architecture with governance gates, and security, oversight, observability and assurance architecture.

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Q4 What tools, methods, or standards are covered in the "Artificial Intelligence (AI) Systems Architecture and Governance" course?

The course covers AI system architecture patterns and reference designs, components across data, features, models, serving and interfaces, batch, real-time, streaming and edge architectures, foundation model versus bespoke model architecture choices, build, buy and partner architecture considerations, architecture quality attributes of scalability, latency and reliability, data ingestion, storage and processing architecture, feature stores, feature engineering and reuse, data lineage, provenance and versioning, data quality, validation and drift in inputs, privacy architecture with minimisation, masking and consent, data retention, deletion and records architecture, model development, training and experiment tracking, model registry, versioning and reproducibility, CI/CD for models and release governance, serving patterns of online, batch and event-driven inference, fallback, degradation and circuit-breaker design, infrastructure, cost and capacity architecture, security architecture with identity, access and least privilege, prompt, tool and API access control architecture, logging, audit trails and traceability by design, human oversight, approval gates and override architecture, the NIST AI Risk Management Framework and ISO/IEC 42001 mapped to architecture, control layering across the AI technology stack, observability architecture with metrics, logs and tracing, drift detection, performance monitoring and alerting, AI incident architecture and response pathways, architecture decision records (ADRs) and documentation, and architecture review board and governance integration.



Q5 How is the "Artificial Intelligence (AI) Systems Architecture and Governance" course applied in real-world practice?

Participants apply it to real work such as designing a governed data pipeline for AI, building a feature store with lineage tracking, designing a deployment architecture with governance gates, layering controls across the AI stack, drafting architecture decision records, running an architecture review against control requirements, and presenting an AI architecture and governance blueprint. The same methods support privacy impact reviews and AI observability design.