

Advanced Data Design, Governance, Analytics & AI for AI-Enabled Government Initiatives

Saudi Arabia Regulatory Guardrails — PDPL, SDAIA & NDMO

Duration: 5 Days / 40 Hours

Mode: Instructor-led, Exercises.

Target Audience: Government data, governance, analytics, AI, IT, compliance and transformation professionals

1. Course Overview

This advanced five-day course equips participants with the knowledge and practical skills required to design data structures, establish data governance, analyse data for evidence-based decision-making, and integrate AI into government initiatives within the Saudi regulatory environment.

The course covers the **Saudi Personal Data Protection Law (PDPL)**, **SDAIA**, **NDMO data governance and classification requirements**, **SDAIA's AI Adoption Framework**, **national AI ethics principles**, **NCA cybersecurity controls**, and **relevant sector regulatory overlays**.

Rather than being purely lecture-based, the course follows a **brief → build → review → gate** methodology. Participants progressively develop government-level initiative business cases throughout the five days. By the end of the course, participants will have developed and assessed a portfolio of initiatives against a comprehensive Saudi data and AI compliance checklist.

2. Course Objectives

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

- Apply advanced data structure and modern data architecture principles.
- Establish data governance operating models covering ownership, stewardship, policies and review cycles.
- Apply NDMO-aligned data classification and governance practices.

- Analyse data quality, integrity and fitness for purpose.
 - Build analytical models, KPIs, indicators and dashboards.
 - Establish evidence-based decision-making frameworks.
 - Apply AI throughout the lifecycle of government initiatives.
 - Use governed institutional data with retrieval-based AI techniques.
 - Understand and apply key PDPL requirements.
 - Identify the roles of SDAIA, NDMO, NCA and relevant sector regulators.
 - Apply AI governance and ethical principles.
 - Assess DPIA requirements for AI and personal-data processing.
 - Evaluate cybersecurity, cross-border transfer and sector-specific requirements.
 - Develop cost models, benefit quantification, risk registers and implementation roadmaps.
 - Develop and defend investment-ready government initiative business cases.
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Day 1 — Data Design, Architecture & Government Initiative Framing

Module 1: Course Introduction & Portfolio Launch

- Course objectives and five-day methodology
- Introduction to the Ten-Initiative Portfolio
- Six Portfolio Gates
- Saudi data and AI standards conformance checklist
- Team formation and initiative ownership
- Lab environment setup and verification

Module 2: Data Structure Design Principles

- Principles of effective data structures
- Normalisation, performance and usability
- Relational data models
- Dimensional data models
- Distributed data models
- Designing data structures for analytics and cross-entity sharing
- Structural defects affecting analysis and auditing

Module 3: Government-Level Need Elicitation

- Identifying organisational problems and opportunities
- Defining beneficiaries and scale
- Identifying available and missing data
- Developing Need Statements

- Government-level initiative screening
- Consolidating and prioritising candidate initiatives

Module 4: Data Classification & Modelling Tools

- Fundamentals of data classification
- NDMO-aligned classification concepts
- PostgreSQL for data modelling
- dbt for transformation and documentation
- OpenMetadata/DataHub for data cataloguing

Module 5: Data Structure Modelling Lab

- Mapping business needs to data requirements
- Identifying data sources
- Building data models
- Testing models against analytical requirements
- Identifying data feasibility gaps

Portfolio Gate 1: Need Screening & Data Feasibility

- Government-level screening
 - Data feasibility assessment
 - Initiative selection
 - Assignment of initiative owners
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Day 2 — Data Governance, Classification & Saudi PDPL

Module 6: Data Governance Foundations

- Principles of data governance
- Governance operating models
- Data ownership and stewardship
- Governance policies
- Review and escalation mechanisms
- Role of NDMO
- SDAIA, NDMO and NCA responsibilities
- SAMA and CST regulatory considerations

Module 7: Data Cataloguing & Metadata Management

- Open-source data catalogues
- OpenMetadata
- Metadata ingestion
- Data lineage
- Data ownership
- Glossaries and governance metadata
- Classification taxonomy

Module 8: Saudi Personal Data Protection Law (PDPL)

- PDPL scope and applicability
- Lawful processing
- Purpose limitation
- Data minimisation
- Retention requirements
- Consent
- Data subject rights
- Transparency and privacy notices
- SDAIA's regulatory role
- PDPL penalties and enforcement considerations

Module 9: Data Classification & Registration Lab

- Identifying data assets
- NDMO classification
- Data asset registration
- Data quality expectations
- Identification of personal data
- Linking classification to PDPL obligations

Module 10: Data Ownership & Cross-Entity Sharing

- Data owner, steward and custodian
- Cross-entity data sharing
- Data-sharing basis
- Resolving ownership conflicts
- Escalation and review processes

Portfolio Gate 2: Governance, Classification & Lawful Basis

- Data Governance Profile
- Classification Record

- Data Sharing Basis
 - Lawful Basis for Processing
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Day 3 — Data Analytics, KPIs, Evidence & Decision Intelligence

Module 11: Decision-Ready Data & Analytics

- Governed data versus decision-ready data
- Analytical pipeline
- Data transformation
- Semantic layers
- Data presentation
- Descriptive analytics
- Segmentation
- Cohort analysis
- Trend analysis
- Benchmarking

Module 12: Data Profiling & Quality Assessment

- Data profiling
- Completeness
- Consistency
- Timeliness
- Integrity
- Data quality measurement
- Identifying structural data problems
- Documenting analytical limitations

Module 13: KPI & Indicator Frameworks

- Objectives versus measurable indicators
- Leading and lagging indicators
- Output versus outcome indicators
- Government-level targets
- Measurement sources
- Benefit baselines
- Decision records

Module 14: Data Transformation with PostgreSQL & dbt

- Building analytical data models
- dbt transformation workflows
- Data testing
- Documentation
- Handling missing and poor-quality data
- Creating auditable transformation pipelines

Module 15: Dashboard & Business Intelligence

- Dashboard design principles
- Decision-oriented visualisation
- Metabase / Apache Superset
- Building initiative dashboards
- Portfolio-level dashboards
- Presenting baseline metrics

Portfolio Gate 3: Evidence, Indicators & Benefit Baseline

- Evidence Base and Baseline
 - KPI and Indicator Framework
 - Benefit Baseline
 - Decision Record
 - Evidence-gap identification
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Day 4 — AI-Enabled Government Initiative Design & AI Governance

Module 16: AI Across the Initiative Lifecycle

- AI for needs analysis
- AI-assisted design
- AI-assisted development
- AI-enabled delivery
- AI-based evaluation
- Identifying high-value AI use cases
- Avoiding inappropriate AI adoption

Module 17: Retrieval-Augmented AI & Governed Data

- Retrieval-based AI
- RAG concepts
- Grounding AI in institutional data
- Classification-aware retrieval
- Preventing unauthorised data exposure
- Testing AI retrieval results

Module 18: AI-Assisted Initiative Blueprinting

- AI-assisted requirements analysis
- Structured prompting
- Initiative blueprints
- Objectives and work plans
- Decision-maker briefings
- AI output validation and quality control

Module 19: SDAIA AI Adoption Framework

- AI governance requirements
- AI risk classification
- Accountability and oversight
- AI monitoring
- Human oversight
- Escalation mechanisms

Module 20: National AI Ethics Principles

- Responsible AI
- Fairness
- Transparency
- Accountability
- Human oversight
- Ethical AI assessment

Module 21: DPIA & AI Risk Assessment

- Data Protection Impact Assessment
- DPIA triggers
- AI systems processing personal data
- AI component risk assessment
- Monitoring guardrails
- Escalation paths

Portfolio Gate 4: Solution Design & Peer Challenge

- Solution Design
 - AI Component Specification
 - Innovation Rationale
 - DPIA Trigger Assessment
 - Peer review and challenge
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Day 5 — Saudi Compliance Clearance, Business Case & Portfolio Prioritisation

Module 22: Cross-Border Data Transfers & Regulatory Overlays

- Personal data transfers outside Saudi Arabia
- Lawful transfer mechanisms
- De-identification
- NDMO data sharing requirements
- Open data considerations
- NCA Essential Cybersecurity Controls
- SAMA and CST sector requirements
- PDPL breach notification

Module 23: Saudi Regulatory Enforcement & Compliance Auditing

- SDAIA enforcement patterns
- Common compliance violations
- Processing without valid legal basis
- Unauthorised disclosure
- Inadequate technical and organisational safeguards
- Marketing without consent
- Compliance auditing methodology

Module 24: Compliance Audit Lab

- Auditing a live data platform
- Identifying configuration weaknesses
- Access control assessment
- Consent and processing assessment
- Mapping findings to regulatory requirements
- Developing monitoring priorities

Portfolio Gate 5: Compliance Clearance

- Full Saudi standards conformance checklist
- Regulatory Conformance Record
- DPIA completion where required
- Risk controls
- Compliance evidence
- Remediation requirements

Module 25: Cost Models & Benefit Quantification

- Capital costs
- Operating costs
- Change costs
- Compliance costs
- Benefit quantification
- Cashable versus non-cashable benefits
- Assumptions and confidence ranges

Module 26: Options Appraisal & Risk Management

- Do-nothing option
- Minimum viable option
- Recommended option
- Cost-benefit comparison
- Risk register
- Dependencies
- Implementation considerations

Module 27: Implementation Roadmap

- Implementation phases
- Governance structure
- Dependencies
- Resource requirements
- Delivery milestones
- Benefit realisation

Portfolio Gate 6: Business Case Completion & Prioritisation

- Complete business case
- Final conformance check
- Portfolio prioritisation
- Value assessment

- Feasibility assessment
- Risk assessment