

# Applied Artificial Intelligence and Data Analytics for Internal Audit

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# Applied Artificial Intelligence and Data Analytics for Internal Audit

## Overview

Internal audit teams face vast volumes of transactional data and complex operating environments that manual sampling can no longer adequately address. This practical programme equips audit professionals to embed modern analytical methods into everyday assurance routines. Participants explore automated testing workflows, machine learning models, and automated reporting techniques to identify control breakdowns, anomalies, and operational inefficiencies across enterprise systems. Teams leave equipped with actionable templates and repeatable scripts to modernize audit delivery. This course is delivered by Agile Leaders Training Center.

## Who Should Attend

- Professionals responsible for executing operational, financial, and compliance audit fieldwork.
- Leaders responsible for audit planning, methodology modernization, and department-wide quality assurance.
- Specialists responsible for continuous control monitoring, data extraction, and fraud exception reporting.
- Risk practitioners responsible for assessing automated business rules and data pipeline integrity.
- Governance personnel responsible for validating algorithmic outputs and internal control evidence.

## Departments and Industries

This course serves analytical assurance teams operating across data-intensive corporate and operational environments.

- Internal Audit and Assurance Departments in Commercial Banking and Financial Services
- Continuous Monitoring and Compliance Units in Telecommunications and Digital Services
- Supply Chain Integrity and Forensic Review Teams in Energy and Petrochemical Sectors
- Internal Control and Operations Review Units in Healthcare and Pharmaceutical Enterprises
- Financial Review and Risk Advisory Groups in Transportation and Logistics Organizations

## Learning Objectives

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

- Apply the CRISP-DM methodology to structure data-driven audit fieldwork.
- Build automated testing scripts using SQL queries and Python pandas routines.
- Diagnose transactional anomalies using isolation forests and Benford distribution testing.
- Evaluate generative artificial intelligence prompts against IIA Global Internal Audit Standards.
- Prioritise audit testing populations using supervised classification scoring algorithms.
- Construct interactive risk indicator dashboards using automated business intelligence pipelines.

## Course Agenda

### Day 1: Audit Data Ingestion and Cleansing Foundations

- ETL Pipeline Design for Core Ledger Ingestion using SQL Queries
- Data Integrity Verification against IIA Standard 2310 Information Requirements
- Missing Value Imputation and Normalization using Python pandas Routines
- Duplicate Payment and Journal Split Identification via Fuzzy Matching Algorithms
- Population Reconciliation Artefacts for Enterprise Resource Planning Extracts

### Day 2: Exploratory Analytics and Anomaly Detection

- Digit Distribution Deviation Analysis using Benford Law Protocols
- Outlier Detection in Procurement Card Spend via Isolation Forest Models
- Clustering Expense Submissions using the K-Means Algorithmic Workflow
- Time-Series Anomaly Detection on Vendor Master File Change Logs
- Exploratory Profiling Worksheets for Segregation of Duties Conflict Logs

### Day 3: Supervised Learning for Risk-Based Sampling

- Stratified Risk Sampling Worksheets based on Logistic Regression Probability Outputs
- Contract Deviation Scoring using Supervised Random Forest Classification
- Automated Scripting for Continuous Control Monitoring Rule Engines
- Control Testing Traceability Matrices using Open-Source Data Pipelines
- Model Performance Evaluation Artefacts using Confusion Matrices and ROC Curves

### Day 4: Natural Language Processing and Generative Audit Tools

- Policy Deviation Review using Term Frequency-Inverse Document Frequency Algorithms
- Regulatory Clause Extraction using Named Entity Recognition Frameworks
- Prompt Architecture Design for Audit Working Paper Summarisation
- Audit Finding Categorisation through Pre-Trained Transformer Ensembles
- Prompt Governance Guardrails aligned with COSO Internal Control Guidance

## Day 5: Capstone Audit Simulation and Dashboard Reporting

- End-to-End Simulation Workflow on a Synthetic Procure-to-Pay Dataset
- Automated Anomaly Script Execution and Exception Register Generation
- Algorithmic Result Validation against Audit Sampling Working Paper Standards
- Executive Key Risk Indicator Storytelling using Dashboard Layout Templates
- Remediation Action Plan Formulation and Audit Committee Presentation Artefacts

## Practical Exercises

Participants apply analytical techniques through guided scenario-based practical assignments across the course modules.

- Suggested activity: Configure an automated duplicate payment script on a mock vendor ledger.
- Suggested activity: Execute an anomaly detection model on travel expense transaction files.
- Suggested activity: Draft an automated audit finding summary using a governed prompt template.
- Suggested activity: Assemble an interactive assurance dashboard linking exception tables to risk registers.

## FAQs

### Do participants need prior programming experience before joining?

Basic familiarity with spreadsheet analysis is sufficient. Guided code templates and no-code analytical methods are provided so that participants can complete all practical tasks without prior programming expertise.

### Which analytical tools are used during the sessions?

The sessions use widely available open-source tools including Python notebooks, SQL query interfaces, and standard business intelligence dashboard utilities designed for audit and assurance environments.

### How do these techniques align with professional audit standards?

Every workflow and documentation template directly reflects the documentation, quality, and evidence evaluation requirements established by the IIA Global Internal Audit Standards and internal control guidance.

### Are the simulated datasets based on realistic operational scenarios?

Yes. The course utilizes sanitized, synthetic datasets that mirror enterprise workflows, including procure-to-pay ledgers, travel expense records, and vendor master change logs from complex corporate operating environments.

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## Conclusion

Participants return to their organizations ready to deploy automated testing routines, screen entire populations for control failures, and eliminate reliance on small sample sizes. By integrating predictive analytics and automated workflows into audit workpapers, internal auditors enhance assurance quality, deliver deeper risk insights, and produce clear visual reporting that strengthens governance across operational and financial processes.

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