Data Analysis and Sampling

About This Course

Course Description
In order to perform successful internal audits, you must know how to reduce a large data set down to critical subsets based on risk or importance, which method of sampling is most appropriate for different situations, and be able to estimate and allocate the sample size to get the most information at the lowest cost.

This three-day course provides the opportunity to learn about population analysis — specifically frequency, time series, and correlational analyses. It will also explore the pitfalls facing auditors in selecting the most appropriate sampling methods, calculating and adjusting sample size, and integrating this knowledge into audit planning and reporting.

This course is appropriate for auditors, managers, and executives working in both the public and private sectors.

Course Objectives
- Summarize introductory terminology and methodology related to Data Analysis and Statistical Sampling.
- Evaluate shapes of distribution relevant to their important characteristics.
- Determine which measure of central tendency and variation to use based on the frequency distribution.
- Evaluate the important differences between a set of data and a chosen benchmark standard using shape, central tendency, and variation.
- Determine when to use correlation and time series analysis.
- Employ random sampling techniques.
- Understand why haphazard sampling should not be used.
- Identify the criteria for non-random selection techniques.
- Apply the binomial equation formula to calculate sample size.
- Employ methods for adjusting sample size.
- Practice combining results, given a scenario.
- Describe elements within the report.
- Balance resources by tracking the various evidence collection methods and tests of controls in the audit program.
Course Topics

**Introduction to Data Analysis**
- Defining Data Analysis
- Data Analysis and Audit Planning
- Population
- Random Sample
- Variables

**Population Analysis: Shapes of Frequency Distributions**
- Descriptive Statistics
- Graphical Presentation
  - Uniform Distribution
  - Skewed Distribution
  - Bimodal Distribution
  - Normal Distribution

**Population Analysis: Measures of Central Tendency and Variation**
- Measures of Central Tendency
  - Mode
  - Median
  - Mean
- Shape of Distribution and Central Tendency
- Measures of Variability
  - Range
  - Quartile Deviation
  - Standard Deviation

**Population Analysis: Comparison to Benchmarks**
- Practice Advisory 2320-1
- IPPF Standard 2320
- Benchmarking
- Recalculations
- Non-Random Selection

**Case Study Using Frequency Distributions**

**Population Analysis: Time Series and Correlational Analysis**
- Time Series Analysis
- Case Study Using Time Series Analysis
- Correlational Analysis
Case Study Using Correlations

Random Sampling
- The Randomness Assumption
- Types of Random Sampling
  - Simple Random Sampling
  - Stratified Random Sampling
  - Haphazard Sampling

Non-Random Selection
- Defining Non-Random Selection
- Fraud Red Flags
- How to Perform Non-Random Selection
- The Credibility Obstacle
- Case Study Using Non-Random Selection

Calculating Sample Size
- Drivers of Sample Size
- Binomial Equation
- Confidence Level
- Expected Error Rate
- Precision
- Pilot Studies

Adjustments to Sample Size
- Population Size
- Resource Constraints
- Strength of Generalization
- Bias and Ethics

Knowledge Check
- Practical Exercises in Calculating Sample Size, Adjusting Sample Size, and Interpreting Results

Combining Results
- Nomenclature
- Combining Error Rates
- Other Weighted Averages
- Combining Non-Random Data
- Generalization and Extrapolation
- Statistical Tests
Reporting
- Mock Report
- What to Include

Audit Program
- Why Do an Audit Program?
- Audit Program Example
- Sortable Audit Program
- Audit Program vs. Audit Sampling
Course Information

Course Duration: 3 Days

CPE Hours Available: 24

Knowledge Level: Intermediate

Field of Study: Auditing

Prerequisites: Data Analysis Overview course, Data Sampling course, Defining Populations for Data Analytics course, or equivalent knowledge.

Advance Preparation: None

Delivery Format: On-site Training (Group-Live); Seminar (Group-Live)