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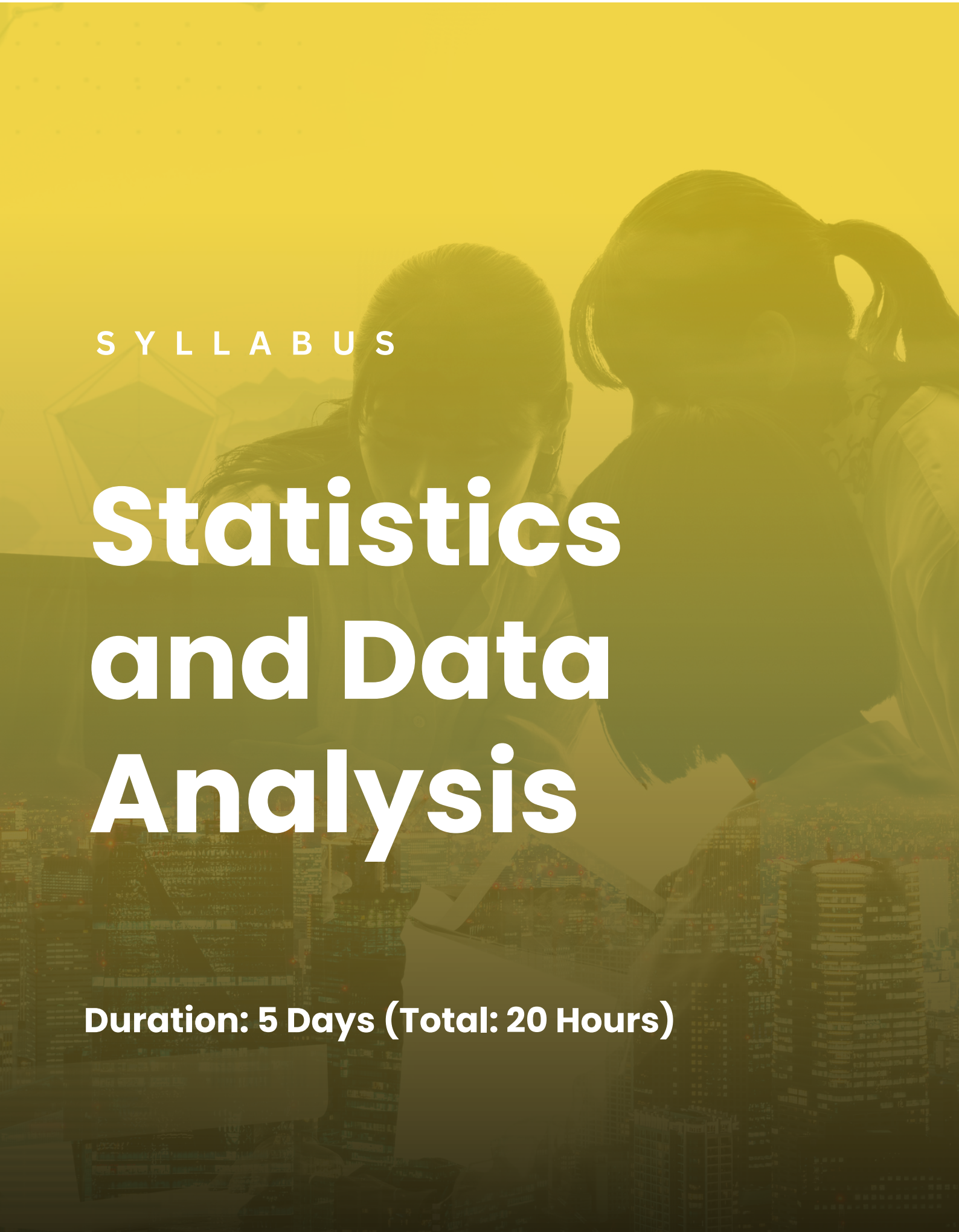

SYLLABUS

# Statistics and Data Analysis

**Duration: 5 Days (Total: 20 Hours)**

## Contents

## 1.0 Course Overview

This course introduces participants to the essential concepts and tools in **statistics and data analysis**, enabling them to collect, clean, analyze, and visualize data in meaningful ways for academic, business, or research purposes.

## 2.0 Learning Outcomes

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

- Understand key statistical concepts and data types
- Collect, clean, and organize datasets for analysis
- Visualize data trends and summaries with charts and tables
- Conduct hypothesis tests, correlations, and regressions
- Interpret results and make evidence-based decisions

## 3.0 Training Methodology

- Real-World Data Sets and Case Studies
- Step-by-Step Demonstrations in Excel/SPSS/Python
- Group Data Challenges and Individual Analysis Tasks
- Practice Worksheets and Assessment Quizzes
- Mini Projects and Data Presentations

## 4.0 Fundamentals of Statistics: Descriptive and Inferential (3 Hours)

**Objectives**:

- Build a foundation in understanding and classifying data

**Topics Covered**:

- Types of Data: Categorical, Numerical, Ordinal
- Measures of Central Tendency: Mean, Median, Mode
- Measures of Spread: Range, Variance, Standard Deviation
- Inferential vs Descriptive Statistics

**Activities**:

- Task: Analyze a small dataset for key descriptive metrics
- Exercise: Group discussion on real-life applications of stats
- Quiz: Classify and interpret types of variables

## 5.0 Data Collection, Sampling & Cleaning (3 Hours)

**Objectives**:

- Learn to gather reliable data and prepare it for analysis

**Topics Covered**:

- Primary vs Secondary Data
- Sampling Methods: Random, Stratified, Systematic
- Bias and Reliability in Data Collection
- Data Cleaning: Handling Missing Values, Outliers, and Duplicates

**Activities**:

- Task: Create a survey and define a sampling method
- Lab: Clean a messy dataset (Excel/SPSS)
- Worksheet: Spot and fix sampling errors in scenarios

## 6.0 Visualizing and Summarizing Data (4 Hours)

**Objectives**:

- Represent data clearly through visual and tabular formats

**Topics Covered**:

- Charts: Histograms, Boxplots, Pie Charts, Bar Graphs
- Frequency Tables and Cross-Tabulations
- Choosing the Right Chart for the Right Data
- Using Visualization to Reveal Patterns and Trends

**Activities**:

- Task: Create 3 types of charts using a given dataset
- Challenge: Visual storytelling with data
- Peer Review: Critique the effectiveness of sample visuals

## 7.0 Hypothesis Testing, Correlation, and Regression (3 Hours)

**Objectives**:

- Apply statistical tests to explore relationships and draw conclusions

**Topics Covered**:

- Null and Alternative Hypotheses
- P-values, Confidence Intervals, and Significance
- Pearson Correlation, Spearman Rank
- Simple Linear Regression

**Activities**:

- Lab: Run a correlation test in Excel/SPSS
- Task: Formulate and test a hypothesis with data
- Group Debate: Misuse and misunderstanding of p-values

## 8.0 Tools and Applications: Excel, SPSS, or Python Basics (3 Hours)

**Objectives**:

- Use analytical tools to automate and execute calculations

**Topics Covered**:

- Data Entry and Formulas in Excel
- Using SPSS for Descriptive and Inferential Stats
- Python Libraries: Pandas, Matplotlib, Scikit-learn (Intro level)
- Automating Charts, Reports, and Analyses

**Activities**:

- Task: Create a dashboard or summary report

- Demo: Basic data analysis with Python code
- Optional: Choose your preferred tool and analyze a mini dataset

## 9.0 Data Interpretation and Reporting Insights (2 Hours)

**Objectives**:

- Turn analysis into action by communicating results clearly

**Topics Covered**:

- Interpreting Trends and Results with Context
- Writing Analytical Summaries
- Avoiding Common Misinterpretation Errors
- Ethical Use of Data

**Activities**:

- Task: Write a 1-page insight report from analysis
- Peer Review: Clarity, relevance, and visualization in reports
- Discussion: “Telling the story behind the numbers”

## 10.0 Conclusion and Wrap-Up (1 Hour)

**Key Takeaways**:

- Review core tools, share your growth, and plan your next step

**Final Activities**:

- Showcase: Mini data project or presentation
- Certificate Distribution
- Journaling Prompt: “What data means to me now…”