

## Course Title: Data Analysis using AI (Gemini AI)

### A. Setting up the AI Environment

- Installing Python and Jupyter Notebook
  - Setting up Google Gemini API/SDK
  - Authenticating API keys and connecting with Python
  - Using Gemini for automated data interaction
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### B. AI-Assisted Data Fundamentals

- Understanding dataset properties through AI prompts
  - Generating dataset summaries automatically
  - AI-assisted data entry validation and cleaning suggestions
  - Importing and handling data formats (.xlsx, .csv, .sql, .sav, .dta) using Gemini guidance
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### C. AI-Guided Data Processing

- Automating data import/export with Gemini-assisted code
  - If-Else conditions and CURD operations with AI-generated Python scripts
  - AI-guided duplicate detection and cleaning
  - Automating dataset merging, appending, and sorting using Gemini
  - AI-assisted feature selection and data comparison
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### D. AI-Driven Data Analysis & Interpretation

#### D.1 Automated Calculations

- Using AI to perform and explain dataset calculations
- AI-generated code for formula application and variable recoding

- Processing text/string and date-time data with Gemini prompts
- AI-generated category creation and grouping

## D.2 AI-Assisted Descriptive Statistics

- Generating automated frequencies and summary tables
- AI interpretation of descriptive statistics (mean, median, SD, etc.)
- Creating pivot tables with AI-generated commentary
- Producing automated percentage and count summaries

## D.3 AI-Assisted Statistical Tests

- Identifying appropriate statistical tests using AI reasoning
- Automating t-test (one-sample, independent, paired) with AI interpretation
- Automating ANOVA with Gemini-generated summary and significance insights
- Conducting Chi-square tests using AI-generated code and explanations
- Performing correlation and regression analysis with AI-assisted result interpretation
- Running reliability analysis (Cronbach's Alpha) and generating automated interpretations

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## E. AI-Assisted Data Visualization

- AI-generated suggestions for chart types
- Automatically generating and labeling graphs with Gemini
- AI-driven editing and customization of visuals
- Exporting charts and reports automatically

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## F. Automated Reporting

- Generating AI-written summaries and insights

- Combining tables, charts, and narratives into a single automated report
  - AI-assisted trend and anomaly explanation
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#### G. Project Work

- Building a Mini AI Data Analyst using Gemini
  - End-to-end automated data analysis (cleaning → analysis → visualization → report)
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#### H. Certification and Presentation

- Presentation of final automated projects
- Discussion on responsible use of AI in data analytics