AI for Research & Data Analysis (Non-CS Students)

This training program is designed to help non-technical students gain practical skills in AI and data analytics for academic research and real-world problem solving. Through guided, hands-on practice using Google Colab and Gemini Assistant, participants learn how to collect, clean, analyze, and interpret data with confidence. The course focuses on applied learning, ethical use of AI, and simple workflows that students from any discipline can easily follow. The program concludes with a complete mini-project where each participant applies AI tools to solve a research problem end to end. Upon completion, learners will be able to perform data analysis independently using Colab and Gemini and translate insights into meaningful results.

Participants: Honors completed or final-year Honors students from any discipline
Prerequisite: Basic knowledge of programming and statistics

Course Plan:

The course consists of 20 classes**,** each 1.5 hours long. Sessions are designed to gradually build students' skills through demonstrations, guided exercises, and hands-on practice in Google Colab with Gemini Assistant support. Each class introduces a focused topic, from data collection and cleaning to exploratory analysis, applied AI, and research reporting, ensuring students develop a complete, practical workflow for AI-driven data analysis. The final classes are dedicated to a mini-project where participants apply all learned techniques to solve a real research problem and present their findings.

Course Outline:

Class	Topic / Focus	Key Activities
1	Introduction to AI & Data Analysis	Overview of AI, data in research, types of data, role of AI; demo of Colab + Gemini
2	Exploring Research Use Cases	Real-life examples; discussion on datasets from different domains
3	Data Collection Basics	Survey data, open datasets, data formats, ethical collection practices
4	Importing Data into Colab	Hands-on importing CSV/Excel/JSON; introduction to notebooks
5	Data Cleaning I	Handling missing values, duplicates, formatting issues
6	Data Cleaning II	Data transformation, feature selection, automation tips using Gemini
7	Exploratory Data Analysis (EDA) I	Descriptive statistics, mean, median, mode; visualizing distributions
8	Exploratory Data Analysis II	Correlation, relationships, scatterplots, bar/line charts

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9	Exploratory Data Analysis III	Advanced visualization: heatmaps, boxplots, interactive charts; AI-assisted insights via Gemini
10	Introduction to Applied AI	Simple predictive tasks, classification vs regression explained
11	Applying AI to Text Data	Text summarization, keyword extraction, sentiment analysis using prebuilt notebooks
12	Applying AI to Structured Data	Regression, classification, clustering with guidance from Gemini
13	Interpreting Model Outputs I	Understanding outputs, accuracy, errors; visual interpretation of results
14	Interpreting Model Outputs II	Practical examples, generating insights and actionable observations
15	Reporting Results I	Translating analysis into tables, charts, and narratives
16	Reporting Results II	Visual storytelling, using AI to summarize findings and highlight key trends
17	Mini-Project Setup	Dataset selection, defining research questions, planning analysis pipeline
18	Mini-Project Analysis I	Data cleaning, EDA, initial AI applications with Gemini support
19	Mini-Project Analysis II	Model application, results interpretation, refining visualizations
20	Mini-Project Presentation	Final insights, report/presentation submission, class discussion, feedback

Course Rules:

1. Students must attend at least 50% of the classes to qualify for certification.
2. All participants must bring their own Gmail account for accessing Colab and Gemini Assistant.
3. Assignments must be submitted on time; late submissions may not be evaluated.
4. Participants must maintain proper data ethics when working with any dataset provided in class.

Assessment Methods:

1. Class Participation and Assignment (50%) – Engagement during discussions, hands-on tasks, and in-class activities. Assignments on short tasks on data cleaning, EDA, visualization, and simple AI applications.
2. Final Exam and Project (40%) – End-to-end research data analysis project including question formulation, data preparation, analysis, visualization, and interpretation.
3. Final Presentation (10%) – Clear communication of findings, proper use of visualizations, and ability to explain results.