Hands-On / Case Study Activities – Summary Across All Three Days

Day 1 – Python Foundations + First Banking/Trading Agent

1. Data cleaning on stock and energy datasets to handle inconsistencies and missing values.

2. Implement a class for “TradeOrder” objects with attributes like order type, amount, price, and methods.

3. Create a decorator for logging transactions, tracking execution time, and recording errors.

4. Fetch live stock and cryptocurrency prices using APIs with asynchronous programming.

5. Q&A exercise on banking regulations using LangChain PromptTemplates and Chains.

6. Build a summarizer for trading reports with Semantic Kernel.

7. Case Study: Develop an AI agent for stock market news summarization (45 min coding + 15 min demo).

Day 2 – Advanced Agents + Energy/Environment Case Studies

1. Build a multi-tool assistant for smart grid management using LangChain agents.

2. Implement emission monitoring flow with state management, branching, and parallel execution.

3. Build an energy usage tracking chatbot with memory and personalized recommendations.

4. Develop a sustainability action planner using Semantic Kernel advanced features.

5. Perform Q&A on environmental compliance documents using RAG pipelines (chunking, retrieval, hybrid search).

6. Build an agent that ingests live climate and IoT sensor data for monitoring purposes.

7. Case Study 2: AI agent analyzing building energy data (30 min coding + 15 min testing).

8. Case Study 3: AI agent calculating and visualizing carbon footprint (30 min coding + 15 min showcase).

Day 3 – Multi-Agent Systems + Capstone

1. Implement smart grid orchestration flow with multiple AI agents.
2. Create a resilient monitoring agent with error handling and fallback mechanisms.
3. Experiment with latest LangChain v0.3 and Semantic Kernel planners.
4. Build a secure and auditable AI agent with logging and safe prompt handling.
5. Capstone Project: End-to-end Energy & Environment AI solution including:
    - Renewable energy forecasting dashboard
    - Smart city energy optimizer
    - Carbon tracker app
      (2.5 hours coding + 30 min testing)
6. Team presentations and feedback showcasing capstone projects.