

ADVANCED EXCEL WITH AI TOOLS

Course Syllabus & Experiment Lab Manual

SR. NO.	TOPICS & EXPERIMENTS	AI TOOL & PROMPT ENGINEERING INTEGRATIONS
1. Basics & Interface		
1A	Introduction to Excel & Exploring the Interface	Introduction to Microsoft Copilot in Excel and workspace environment setup.
1B	Rows, Columns, and Essential Keyboard Shortcuts	Using AI to generate custom contextual cheat sheets for targeted operational workflows.
1C	Data Entry and Filled Series	Prompting generative AI to produce structured, clean mock datasets for scenario practice.
2. Formatting & Referencing		
2A	Formatting Data in Excel	Utilizing AI assistants to recommend professional custom formatting rules and styles.
2B	Cell Referencing (Absolute, Relative, and Mixed)	Leveraging LLMs to break down and explain complex multi-layered cell-referencing structures.
2C	Named Ranges and Basic Arithmetic Functions	Generating natural-language instructions to automatically establish dynamic named ranges.
3. Mathematical & Logical Functions		
3A	Using Arithmetic and Statistical Functions	Deploying specialized **Formula Bots** to construct advanced mathematical and statistical workflows.
3B	Logical Functions (IF , AND , OR , NOT , Nested IF , IFERROR)	Drafting, mapping, and testing complex nested logical arguments using step-by-step AI prompts.
3C	Combining Arithmetic and Logical Functions	Applying precise prompt engineering techniques to debug hidden logic errors in formulas.
4. Lookup & Relationship Functions		
4A	Using the LOOKUP & HLOOKUP Functions	Mapping horizontal structural arrays and index matrices using conversational AI assistance.

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4B	Using VLOOKUP Function	Troubleshooting classic lookup errors (such as #N/A , #REF!) using instant AI error analysis.
4C	Nested VLOOKUP & modern alternatives	Instructing AI to translate legacy matrix queries into highly efficient modern XLOOKUP structures.
5. Advanced Functions		
5A	INDEX and INDEX with MATCH	Prompting AI to generate multi-criteria coordinate search equations for complex arrays.
5B	INDIRECT Function	Creating variable and dynamic tab/workbook cross-referencing setups with natural language models.
6. Data Validation		
6	Data Validation and Dependent Drop-down Lists	Using AI to formulate validation rules and architect cascading multi-tier drop-down selection systems.
7. Date & Text Functions		
7A	Date Functions (DAY , MONTH , YEAR , EOMONTH , DATEDIF , YEARFRAC)	Solving complex regional timeline gaps, dynamic aging schedules, and timeline math using AI prompts.
7B	Text Functions (UPPER , LOWER , PROPER , LEFT , RIGHT , MID , SEARCH , CONCAT)	Leveraging AI for unstructured data extraction, custom text block isolation, and Regex pattern translations.
8. Data Cleaning & Handling		
8A	Data Cleaning (Remove Duplicates, Format Numbers, Apply Shortcuts)	Using Copilot to instantly scan, isolate anomalies, and execute scrubbing protocols on large raw datasets.
8B	Data Handling (Basic & Advanced Sort, AutoFilter, Advanced Filter)	Instructing AI models to write out custom non-standard boolean rules for advanced data filters.
9. Data Visualization		
9A	Conditional Formatting (Color Scales, Icons, and Data Bars)	Prompting AI engines to extract contextual trend patterns and recommend UI/UX design themes.
9B	Creating Basic Charts (Bar, Column, Line, and Pie Charts)	Consulting AI for statistical optimization to select the most intuitive visualization for specific audiences.

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9C	Creating Advanced Charts (Combo, Waterfall, and Gantt Charts)	Following detailed, AI-guided structural checkpoints to build out production-ready schedule tracking timelines.
10. Data Summarization		
10A	Creating and Using Pivot Tables	Prompting Copilot in Excel to construct complex dynamic summary tables instantly using simple queries.
10B	Creating and Using Pivot Charts	Generating high-impact interactive analytical graphics driven by contextual AI suggestions.
10C	Using Slicers with Pivot Tables and Pivot Charts	Applying ergonomic dashboard design frameworks recommended by AI layout experts.
11. Power Query & Power Pivot		
11A	Introduction to Power Query – Connecting to Data	Utilizing AI explanations to map corporate extraction pathways from diverse raw storage formats.
11B	Data Cleaning and Transformation using Power Query	Drafting tailored advanced data mashup transformations using AI-generated M Code routines.
11C	Using Power Pivot – Creating Data Models	Employing AI to architect robust relational database models and generate high-performance DAX measures.
12. Query Merging		
12	Merging and Appending Queries using Power Query	Prompting AI models to safely map key field mismatches and protect data integrity during multi-source joins.
13. Interactive Dashboards		
13	Creating Interactive Dashboards (Pivot Tables, Charts, and Slicers)	Leveraging AI to plan data wireframes, determine target layouts, and clarify tracking indicators (KPIs).
14. Automation with Macros		
14A	Recording a Macro – Name, Storage, Formatting (Absolute Reference)	Generating tailored structural workflows and step-by-step optimization blueprints prior to recording.
14B	Editing Macros & Recording with Relative Reference	Isolating inefficiencies and applying AI refactoring steps to convert fixed recordings into scalable code blocks.

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14C	Running a Macro Using Buttons and Shapes	Building user-friendly custom application triggers with the help of AI interactive layout principles.
15. Automation Using VBA		
15A	Introduction to VBA Programming in Excel	AI-Assisted Coding: Directing ChatGPT/ Copilot to assemble robust VBA code scripts via natural language text definitions.
15B	Conditional and Loop Structures in VBA (If , Select Case , For , Do While)	Debugging unexpected script compilation hanging issues and fixing runtime logic flaws instantly with AI reviews.
15C	Creating and Using a User Form in VBA	Generating optimized functional background event handlers for high-utility administrative GUI forms using AI prompts.