LINKSKILL ACADEMY

THE ULTIMATE DATA ANALYTICS STARTER KIT

2027 EDITION | FREE LEARNING RESOURCE

Your beginner-friendly guide to Excel, SQL, Power BI, Python and portfolio projects.

01 Data Analyst Roadmap 2027

02 Excel Quick Reference

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04 Power BI Dashboard Guide

05 Python Essential Functions

06 10 Real-World Project Ideas

Practical skills. Real business questions. Proof of work.

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How to use this starter kit

This is a learning companion, not a certificate or a promise of employment. Follow the modules in order, complete the mini tasks, and save your work as portfolio evidence.

• Read one concept and reproduce the example yourself.

• Use fictional or public datasets; never upload confidential company data.

• Document the business question, cleaning steps, analysis, visual, and recommendation.

• Repeat a task without looking at the answer before moving on.

Suggested 4-week learning sprint

Week	Focus	Deliverable
1	Excel fundamentals and cleaning	One cleaned workbook and summary
2	SQL querying and aggregation	Ten working SQL queries
3	Power BI data model and visuals	One interactive report
4	Python analysis and portfolio	Notebook + case-study write-up

The six-stage analyst workflow

ASK → CLEAN → ANALYZE → VISUALIZE → PRESENT → RECOMMEND. A dashboard alone is not the final outcome: explain what the numbers mean and what action a business should consider.

01 Data Analyst Roadmap 2027

A realistic skills roadmap: build fundamentals first, then deepen your work through projects. Hiring requirements vary by role, industry and employer.

Stage	Learn	Evidence
1. Business thinking	KPIs, dimensions, metrics, basic statistics	Write five measurable business questions
2. Excel	Tables, formulas, lookups, PivotTables	Clean and summarize 500 rows
3. SQL	SELECT, filters, joins, GROUP BY, subqueries	Answer ten business questions
4. Power BI	Power Query, relationships, DAX, design	Build one KPI dashboard
5. Python	pandas, validation, grouping, plotting	Create a reproducible notebook
6. Portfolio	Storytelling, QA, stakeholder recommendations	Publish 2–3 documented projects

Starter project: retail revenue drop

Business question: Revenue fell this month. Is the change driven by fewer orders, lower average order value, product mix, or cancellations?

- Define revenue, order count, average order value and cancellation rate.
- Compare current and previous periods using consistent date filters.
- Segment by category, city and channel; inspect missing values and returns.
- Write a three-sentence recommendation with assumptions and limitations.

02 Excel Quick Reference

Skill	Example	Why it matters
SUM / AVERAGE	=SUM(E2:E101)	Total or average numeric values
IF	=IF(E2>=5000,"High","Standard")	Create business categories
COUNTIF	=COUNTIF(C2:C101,"Delivered")	Count matching records
SUMIFS	=SUMIFS(E:E,C:C,"Delivered",B:B,"Salem")	Sum with multiple conditions
XLOOKUP	=XLOOKUP(A2,Products!A:A,Products!B:B,"Not found")	Retrieve a matching value
IFERROR	=IFERROR(E2/F2,0)	Handle expected calculation errors
TEXT	=TEXT(A2,"mmm yyyy")	Display month-year text
TRIM	=TRIM(B2)	Remove extra spaces

Note: Formula separators, availability and function names can vary by Excel version and locale. XLOOKUP is not available in every older Excel edition.

PivotTable mini-workflow

• Convert source range into a Table (Ctrl+T).

• Insert → PivotTable; put City in Rows, Category in Columns, Revenue in Values.

• Check that Revenue uses Sum rather than Count.

• Add a Month filter or slicer; refresh after changing source data.

Practice

Create columns: Order_ID, Order_Date, City, Category, Status, Quantity, Unit_Price. Calculate Revenue = Quantity × Unit_Price. Find the top three cities by delivered revenue.

03 SQL Basics Cheat Sheet

Assume a table orders(order_id, order_date, city, category, status, quantity, unit_price). Examples use SQL Server-compatible syntax.

Select and filter

```
SELECT order_id, city, quantity
FROM orders
WHERE status = 'Delivered' AND quantity >= 2;
```

Aggregate by segment

```
SELECT city, SUM(quantity * unit_price) AS revenue
FROM orders
WHERE status = 'Delivered'
GROUP BY city
HAVING SUM(quantity * unit_price) > 50000
ORDER BY revenue DESC;
```

Join related tables

```
SELECT o.order_id, c.customer_name
FROM orders AS o
INNER JOIN customers AS c
ON o.customer_id = c.customer_id;
```

Subquery: above-average order value

```
SELECT order_id, quantity * unit_price AS order_value
FROM orders
WHERE quantity * unit_price >
(SELECT AVG(1.0 * quantity * unit_price) FROM orders);
```

Concept checklist

- WHERE filters rows before grouping; HAVING filters grouped results.
- INNER JOIN keeps matches; LEFT JOIN keeps every left-side row.
- COUNT(*) counts rows; COUNT(column) excludes NULL in that column.
- SQL Server uses TOP (n); PostgreSQL/MySQL commonly use LIMIT n.
- Avoid SELECT * in production reports; select needed fields.

04 Power BI Dashboard Guide

Build a simple sales performance report

- Import the sales file with Get Data; inspect data types in Power Query.
- Remove duplicates only after identifying the correct business key.
- Create a Date table and appropriate relationships.
- Define measures; validate totals against the source file.
- Add KPI cards, monthly trend, category breakdown and city comparison.
- Use slicers for date, city and category; test cross-filter interactions.

Starter DAX measures

```
Total Revenue = SUMX(Orders, Orders[Quantity] * Orders[Unit_Price])

Total Orders = DISTINCTCOUNT(Orders[Order_ID])

Average Order Value = DIVIDE([Total Revenue], [Total Orders])
```

Important: If the Orders table contains line items, define Order_ID consistently and exclude returns/cancellations where required by the business definition.

Dashboard layout wireframe

Top row	Middle row	Bottom row
Revenue | Orders | AOV	Revenue trend by month	Top categories by revenue
Date / City slicers	City revenue comparison	Business insight + action

Quality checklist

- Clear report title, period and currency units.
- No misleading truncated axes on comparisons.
- Consistent colors; readable labels; accessible contrast.
- Show last refresh date where appropriate.
- Test every filter and reconcile at least three KPIs.

05 Python Essential Functions

Install Python and pandas in a suitable environment. The following example assumes a file called sales.csv containing Quantity, Unit_Price, City and Status columns.

```
import pandas as pd
df = pd.read_csv("sales.csv")
print(df.head())
print(df.info())
print(df.isna().sum())
```

Ten useful pandas operations

Operation	Example
Preview	df.head()
Shape	df.shape
Missing values	df.isna().sum()
Remove duplicates	df.drop_duplicates()
Filter	df.loc[df["Status"] == "Delivered"]
New column	df["Revenue"] = df["Quantity"] * df["Unit_Price"]
Group and sum	df.groupby("City")["Revenue"].sum()
Sort	df.sort_values("Revenue", ascending=False)
Unique values	df["City"].nunique()
Export	df.to_csv("clean_sales.csv", index=False)

Mini analysis

```
delivered = df.loc[df["Status"] == "Delivered"].copy()
delivered["Revenue"] = delivered["Quantity"] * delivered["Unit_Price"]
city_sales = delivered.groupby("City")["Revenue"].sum()
print(city_sales.sort_values(ascending=False).head(5))
```

Always check column names, data types, nulls, negative quantities and duplicate keys before trusting results.

06 Ten Real-World Project Ideas

01 Retail sales decline

Question: Monthly revenue, orders, AOV and category mix
Suggested tools: Excel + Power BI

02 Customer churn

Question: Identify segments with high churn rate
Suggested tools: SQL + Power BI

03 HR attrition

Question: Compare attrition across tenure and department
Suggested tools: Excel + Power BI

04 E-commerce delivery

Question: Analyze late deliveries and refund patterns
Suggested tools: SQL + Python

05 Marketing campaign ROI

Question: Compare cost, leads, conversion and revenue
Suggested tools: Excel + Power BI

06 Inventory stockouts

Question: Flag products with low stock coverage
Suggested tools: SQL + Power BI

07 Call-center performance

Question: Review SLA, handling time and repeat contacts
Suggested tools: Excel + Power BI

08 Student course engagement

Question: Track attendance, completion and assessments
Suggested tools: SQL + Python

09 Hospital appointment no-shows

Question: Explore no-show patterns without personal identifiers
Suggested tools: Python + Power BI

10 SaaS subscription revenue

Question: Analyze MRR movement and cancellations
Suggested tools: SQL + Power BI

Portfolio case study template

Business context

Who needs the analysis and why?

Problem statement

One measurable question, time period and scope.

Dataset

Source, row count, field definitions and limitations.

Cleaning log

Nulls, duplicates, outliers and transformation decisions.

Analysis

Measures, segments, calculations and validation.

Visuals

2–4 clear charts with appropriate labels.

Insight

What changed, for whom, by how much?

Recommendation

Action, expected impact, risk and next measurement.

A 30-minute self-assessment

- What is the difference between a metric and a dimension?
- When should you use SUMIFS instead of SUM?
- How do WHERE and HAVING differ?
- Why are relationships important in Power BI?
- What checks should happen before groupby() in pandas?
- How would you explain an unexpected revenue spike to a manager?

Your next step

You now have a foundation to begin practising. Choose one project, work through the complete analyst workflow, and publish a short case study with screenshots and your reasoning.

7-day starter challenge

Day 1: Define 5 KPIs for a sample retail business.

Day 2: Build and clean a 100-row Excel sales table.

Day 3: Create 2 PivotTables and explain the results.

Day 4: Write 5 SQL filters and 3 grouped queries.

Day 5: Create 3 Power BI visuals and 2 DAX measures.

Day 6: Use pandas to clean and group the same dataset.

Day 7: Present a one-page business recommendation.

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