

# Data Literacy Package (170 hours)

## Course List:

1. Data Literacy [40 hours]
2. Data Visualization [20 hours]
3. Data Analysis [20 hours]
4. Advanced Spreadsheets [20 hours]
5. DA Excel Capstone [10 hours]
6. Introduction to Dashboards [15 hours]
7. DA Sheets Capstone [5 hours]
8. DA Tableau Capstone [10 hours]
9. DA Power BI Capstone [10 hours]
10. CompTIA Data+ Exam Prep Course [20 hours]

## Package Description:

You begin with **Data Literacy**, learning all about the foundations of data and how to work with the most common way to see data: spreadsheets. You will practice manipulating and formatting data, use formulas and basic calculations, and learn complex functions for all kinds of data you might work with.

Then, you learn data visualization principles, techniques, and tools in **Data Visualization**. You learn and work with many types of visualizations and learn when they are most appropriate. This includes working with line charts, bar charts, combo charts, pie charts, donut charts, histograms, and more.

You move on to **Data Analysis** next where you learn about understanding what the data is saying. You learn core research concepts including understanding independent and dependent variables, how to work with time series, linear regression, and more, and learn some statistics knowledge. You also work with variability, probability, frequency distributions, confidence intervals, homoskedasticity, correlation, clustered data, and more. You also learn various types of tests that can be performed on data to ensure your findings are accurate. This all equips you to be able to work with data models of all kinds.

Then, in **Advanced Spreadsheets**, you expand on your spreadsheet skills and learn tools such as pivot tables and VLOOKUP. You also work with the QUERY function, macros, and more so that you can employ the power of spreadsheets in full.

You then complete the **DA Excel Capstone**, which is a data analysis project to start putting your skills into practice in large-scale projects.

Then, you flesh out your Data Analysis training with **Introduction to Dashboards**. You learn what dashboards are and how they are used. You also learn how to prepare data for use in dashboards, and learn hands-on how to create various kinds of dashboards yourself.

After that, you complete **three more capstones** putting all of your new analysis skills to use. Each project features a different dashboard and analysis tool, and all contribute to a project portfolio that you will be able to use to show your experience in the future.

Finally, the **CompTIA Data+ Exam Prep Course** prepares you for the CompTIA's Data+ exam, an industry-recognized certification, which adds a significant weight to your resume.

## Package Syllabi:

### Data Literacy

#### Unit 1

##### Section 1: Data literacy and introduction to spreadsheets

- Data literacy and its four main components.
- Why everybody needs to be data literate today.
- Brief history of spreadsheets.
- Two main spreadsheet products.
- The spreadsheet environment.
- The different roles of rows and columns in a table of data.
- Row and column labels, and cell positions (addresses).
- Enter values in cells.
- Locate cells using the name box.
- Enter or edit values in the formula bar.
- The functionality provided in the main menu and on the toolbar.
- Search and search-and-replace in spreadsheets.
- Select all cells in the spreadsheet.
- Importance of learning keyboard shortcuts.
- Navigate the spreadsheet with the keyboard.

##### Section 2: Cell ranges

- Identify cell ranges in the spreadsheet.
- Select cell ranges with the mouse.
- Select cell ranges which are entire rows or columns, or their parts.
- Select multi-row and multi-column ranges.
- Modify cell ranges with the shift key and arrows.
- Select cell ranges via the name box.
- Select open-ended row and column ranges.
- Remove values from selected columns or rows.
- Remove formatting from selected columns or rows.
- Remove selected columns or rows completely.
- Perform basic operations with cell ranges.
- Print out selected cell ranges, whole sheets, and entire workbooks.
- Format data for printing (set ranges, margins, scaling, alignment, page breaks, headers and footers, etc.).

##### Section 3: Data manipulation and formatting I

- Take full advantage of the cut, copy, and paste functionality.



- Move values and formatting between individual cells.
- Move content between columns, rows, and ranges.
- Format numbers in many different ways.
- Change text font and font size.
- Use alternating colors to make spreadsheets easier to read.
- Change the default column width and height.
- Fit column width to data.
- Align text horizontally and vertically.
- Wrap or clip text which exceeds the width of the column.
- Add borders to individual cells, rows, columns, and arbitrary cell ranges.
- Rotate text in cells or stack it vertically.

## Section 4: Data manipulation and formatting II

- Change text color and cell background color.
- Apply conditional formatting to text, dates, and numerical values.
- Clear cells, columns, rows, and arbitrary cell ranges.
- Delete cells, columns, rows, and arbitrary cell ranges.
- Insert cells, columns, rows, and arbitrary cell ranges.
- Move columns, rows, and multi-column and multi-row ranges.
- Hide columns, rows, and multi-column and multi-row ranges.
- Sort the spreadsheet according to a selected column.
- Take advantage of the Format Painter tool on the toolbar.
- Use copy-and-paste to fill arbitrary cell ranges with data.
- Refine copying and pasting with paste special.
- Use paste special to transpose tables.

## Section 5: Data manipulation and formatting III

- Copy and paste tabular data from the web into spreadsheets.
- Import data stored in Comma-Separated Values (CSV) files.
- Copy and paste text CSV data into spreadsheets.
- Clean imported data and reformat tables.
- Use column stats to discover typos in text data.
- Correct typos with the help of the Spell Checker.
- Create custom filters and save them as filter views.
- Merge cells to improve spreadsheet structure.
- Group columns and rows.
- Freeze columns and rows.
- Insert and manipulate images.
- Create and apply data validation rules.
- Use additional keyboard shortcuts.
- Perform tedious low-level text editing operations efficiently.

## Unit 2

### Section 6: Formulas and basic calculations

- Perform simple calculations in cells using the arithmetic operations  $+$ ,  $-$ ,  $*$ ,  $/$ , and  $^$ .
- Perform arithmetic operations in the correct order (PEMDAS).
- Avoid some common mistakes in spreadsheet calculations.
- Write formulas which contain variables.
- Display formulas in the spreadsheet.
- Copy formulas to other cells and ranges.
- Take advantage of autofill and autocomplete suggestions.
- Understand error messages in formulas.
- Perform calculations with entire columns.
- Work with absolute and semi-absolute cell addresses.

### Section 7: Functions, Booleans, and conditions

- Convert decimal numbers to fractions, and enter fractions in cells via formulas.
- Type functions in cells using the keyboard, and select functions from the Functions menu on the toolbar.
- Distinguish between aggregate and granular data.
- Work with the five most important aggregate functions SUM, AVERAGE, COUNT, MAX, and MIN.
- Use the operator functions ADD, MINUS, MULTIPLY, and DIVIDE which are equivalent to the arithmetic operators  $+$ ,  $-$ ,  $*$ , and  $/$ .
- Use elementary math functions ABS, FLOOR, CEILING, MOD, and FACT.
- Work with the three main measures of central tendency: the mean (arithmetic average), median, and mode.
- Understand that the median is less sensitive to outliers than the mean.
- Use the elementary stat functions AVERAGE, MEDIAN, and MODE.
- Understand the  $=$  sign as an operator.
- Work with the comparison operators  $<>$ ,  $>$ ,  $<$ ,  $>=$ , and  $<=$ .
- Understand Boolean values, operators, and expressions.
- Work with the Boolean values TRUE and FALSE.
- Use the comparison operators  $=$ ,  $<>$ ,  $<$ ,  $>$ ,  $<=$ , and  $>=$  to write Boolean expressions which evaluate to TRUE or FALSE.
- Work with the operator functions EQ, NE, LT, GT, LTE, and GTE which are equivalent to the comparison operators  $=$ ,  $<>$ ,  $<$ ,  $>$ ,  $<=$ , and  $>=$ .
- Use the operator function ISBETWEEN which evaluates to TRUE or FALSE.
- Work with the function RANDBETWEEN to generate random numbers between two given values.
- Use the function IF to formulate conditions, and insert conditions into calculations.

### Section 8: Conditional aggregate functions, wildcards, arrays

- Use additional counting functions including COUNTA, COUNTBLANK, and COUNTUNIQUE.
- Work with the conditional aggregate functions COUNTIF, SUMIF, and AVERAGEIF.

- Use the wildcards \* and ? to match text strings using incomplete search patterns.
- Use the multi-conditional function IFS.
- Insert wildcards into the functions IF and IFS via COUNTIF and possibly other conditional aggregate functions.
- Know that neither ordinary Boolean expressions nor ordinary aggregate functions recognize wildcards.
- Know that functions IF and IFS interpret nonzero values as TRUE and zeros as FALSE.
- Use the multi-conditional aggregate functions COUNTIFS, SUMIFS, AVERAGEIFS, MAXIFS, and MINIFS.
- Define horizontal, vertical, and rectangular arrays.
- Use arrays to leave out, or rearrange, columns and rows in cell ranges.
- Access data in other sheets in the same spreadsheet.
- Import data from spreadsheets on the web with the function IMPORTRANGE.
- Apply formulas to cell ranges with the function ARRAYFORMULA.

## Section 9: Date and time, Boolean logic, info functions, errors

- Convert dates to integer values for mathematical calculations using the functions DATEVALUE and N.
- Find the number of days between two given dates by subtracting them.
- Compare dates using the operators =, <>, <, >, <=, and >=.
- Check the validity of dates with the function ISDATE.
- Build dates from a given year, month, and day using the function DATE.
- Generate random dates with the function RANDBETWEEN.
- Find the difference between dates in days, whole months, and whole years using the function DATEDIF.
- Extract the day, month, and year from a given date with the functions DAY, MONTH, and YEAR.
- Obtain the current date from the operating system with the function TODAY .
- Obtain serial numbers of time values using the functions TIME and N.
- Use the functions TIMEVALUE and TIME in calculations.
- That time values are represented using decimal serial numbers between 0 and 1.
- About the difference between time of day and duration.
- Correctly use time of day and duration in calculations.
- Add date and time values, both directly and via their serial numbers.
- Generate random date and time values with the functions RANDBETWEEN and RAND.
- Extract components of time values using the functions HOUR, MINUTE, and SECOND
- Enter the current date and time with the keyboard (static).
- Enter the current time with the function NOW (dynamic).
- Work with the Boolean functions AND, OR, NOT, and XOR.
- Read truth tables to understand the outcomes of Boolean operators.
- Write complex IF and IFS functions with multiple conditions and Boolean operators.
- Understand the difference between data wrangling (munging) and data cleaning.
- Use the info functions ISBLANK, ISTEXT, ISNONTEXT, ISNUMBER, ISLOGICAL, and ISFORMULA.
- Count empty cells with the function COUNTIF, checking for the presence of the empty text string "".
- Work with the info functions ISDATE, ISEVEN, ISODD, ISEMAIL, and ISURL.
- Understand the seven basic types of errors #NULL!, #DIV/0!, #VALUE!, #REF!, #NAME?, #NUM!, and #N/A.

- Classify errors with the function ERROR.TYPE.
- Insert #N/A values into the spreadsheet, and when this can be useful.
- Detect errors with the functions ISERROR, ISNA, ISERR, and IFERROR.
- Use the info functions TYPE and CELL.

## Section 10: Text processing, basic data lookup

- Know the types and properties of text strings.
- Use text functions to work with text strings.
- Obtain the length of text strings with the function LEN.
- Trim excess white spaces from text strings with the function TRIM.
- Convert numbers to text with the function TEXT. Use parameters to specify text formats such as date, time, currency, fractions, and phone numbers.
- Convert text to numbers with the function VALUE.
- Extract text from strings with the functions LEFT, RIGHT, MID, and FIND.
- Search for text in strings with the functions FIND and SEARCH.
- Split text strings with the function SPLIT.
- Concatenate and append text strings with the functions CONCAT, CONCATENATE, JOIN, and with the ampersand &.
- Change text case (upper case, lower case, proper case) with the functions UPPER, LOWER, and PROPER. Use case as part of data validation procedures.
- Replace and substitute text with the functions REPLACE and SUBSTITUTE.
- Understand text file formats and delimiters.
- Convert text to columns with functions and built-in tools.
- Parse text strings.
- Use the function MODE to obtain the mode of numeric data.
- Look up data with the functions MATCH and INDEX.
- Use functions INDEX, MODE, and MATCH to obtain mode for non-numeric data.
- Use the function COUNTUNIQUE to find problems in data.
- Obtain the list of unique values with the function UNIQUE.
- Make sorted copies of ranges with the function SORT, including advanced multi-criteria sorts.
- Make filtered copies of ranges with the function FILTER.

---

# Data Visualization

## Unit 1

### Section 1: Fundamental data concepts

- The difference between data and information.
- Classify data based on its type as quantitative (numerical) and qualitative (categorical).
- Numerical data can be continuous and discrete.
- Continuous numerical data is further subdivided into interval and ratio data.

- Categorical data is further subdivided into nominal and ordinal.
- Classify data based on its origin as observational, experimental, simulation, and derived / compiled.
- Classify data based on confidentiality as public, internal, confidential, and restricted.
- Main data standards and regulations including SOC 2, HIPAA, PCI DSS and GDPR.
- Binary data, binary data can be numerical or categorical.
- Five steps of the data analysis process.
- Differences between first party, second party and third party data.
- Seven main methods of data collection, including their strengths and weaknesses.
- Among the various data collection methods, surveys, interviews, and focus groups are most prone to bias.
- Types of bias including sampling bias, wording (collection) bias, and participant (subject) bias.
- Main types of biased questions, and how to avoid them.
- Analytics maturity, and where most companies stop before achieving it.
- Four main stages of data analysis: descriptive, diagnostic, predictive, and prescriptive.

## Section 2: Introduction to data visualization

- Even a simple visualization can boost our understanding of the data in a major way.
- Line charts, area charts, and column charts can be used to visualize quantitative (numerical) data.
- Horizontal (X) axis data are called "labels", and vertical (Y) axis data "series".
- The software is in active development, and the outcomes sometimes differ from expectations.
- How to convert a column chart into a line chart when a line chart is expected.
- Qualitative (categorical) data can be visualized using pie charts, column charts, and bar charts.
- Geo charts (maps) can be used to visualize quantitative data related to countries, such as population, birth rate, life expectancy, GDP, etc.
- Visualizations can be used to see the big picture.
- Visualizations can help us find anomalies and hidden problems in our data.
- Visualizations can be used to compare similar datasets.
- Dashboard vs. infographic, visualizations are important components of both.
- Positive and negative correlation.
- Bar chart is preferable over a column chart if the labels are long, or when there would be more than 10-12 columns.
- How to select data ranges for the chart in four different ways.
- Why it is important to always include chart title, horizontal (X) and vertical (Y) axis titles, and possibly a subtitle.
- Insert and modify chart title, subtitle, and the titles of the X and Y axes..

## Section 3: Line charts, manipulating and customizing charts

- A useful shortcut when opening the Chart Editor.
- How to add, remove, and rename data series in the chart.
- That the line chart requires X-axis values to be an ordered sequence.
- That empty cells can cause the software to select a column chart instead of a line chart.
- How to reverse the orientation of the X axis, and when this can be useful.
- How to display multiple series at once in a line chart.
- How to insert and modify the legend.





- How to change line color, thickness, and style.
- How to highlight selected data points of interest.
- How to work with gridlines and ticks.
- How to set minimum and maximum values on each axis.
- When and how to use the logarithmic (log) scale.
- That linear relationships no longer produce straight lines on the log scale, and exponential relationships produce straight lines.

## Section 4: Bar charts, combo charts, pie charts, donut charts, and histograms

- How to visualize row series (so far, our data series always were columns).
- How to visualize complex datasets with multiple series using clustered column and bar charts.
- That a clustered column / bar chart should never display more than 4-5 series.
- How to transpose charts (switch columns and rows internally) without transposing the sheet.
- About the standard problem with the X-axis title that occurs when transposing charts.
- How to highlight selected columns or bars of interest using different fill colors or borders.
- How to create stacked column and bar charts.
- About the main advantage of stacked column/bar charts over clustered charts.
- How to create doughnut (donut) charts which are equivalent to pie charts.
- How to use column charts and bar charts to visualize frequencies (counts) of both categorical and numeric data.
- When and how to use histograms.
- About the main difference between histograms and column/bar charts.
- How to maximize charts and give them a 3D look.

## Section 5: Other types of charts, miscellaneous techniques

- Smooth line charts and stepped area charts, and how they compare to the standard line and area charts.
- Combination (combo) chart to simultaneously display quantities which should not be compared directly.
- Waterfall charts to visually illustrate how a starting value becomes a final value through a series of intermediate additions and subtractions.
- Candlestick charts to show price movements of some asset, such as currency, securities, or derivatives.
- Radar (spider web) charts to compare two or more items or groups on various features or characteristics.
- Treemap charts to visualize the structure of hierarchical data.
- Organizational charts to show the internal structure of organizations, and also to display other hierarchical data.
- Gauge charts to quickly see how well a given metric is performing against a target goal.
- Scorecard charts to highlight key performance indicators (KPIs) together with a change in their value over a specific baseline value.
- Table charts to present spreadsheet data in a nicer and more focused way.
- Gantt charts to visualize project timelines.

- Sparklines to show trends in a series of values, such as seasonal increases or decreases, economic cycles, or to highlight maximum and minimum values.
  - Scatter and bubble charts as a teaser for the follow-up course *Data Analytics with Spreadsheets*.
  - Downloading and publishing charts, miscellaneous techniques.
- 

## Data Analysis

### Unit 1

#### Section 1

- Understand variables, observations, and causal relationships.
- Know what independent (explanatory) and dependent (response) variables are.
- Know the meaning of independent observations and data compatibility.
- Understand time series, cross-sectional studies, interpolation, and extrapolation.
- Know how to create the scatter chart and enable the trendline.
- Know the basic idea of linear regression.
- Know how to use the scatter chart and trendline to make predictions visually.
- Know how to work with the equation of the line  $y(x)=mx+b$ .
- Know how to make predictions numerically when the equation of the trendline is known.
- Know how to display the equation of the trendline in the legend of the scatter chart.
- Understand that the predictions can be inaccurate when the equation of the trendline is taken from the legend of the scatter chart.
- Know how to obtain the slope  $m$  and Y-intercept  $b$  of the trendline accurately with the spreadsheet functions SLOPE and INTERCEPT.
- Know how to make predictions numerically using the function FORECAST.
- Know basic facts related to time series analysis.
- Know how to use higher-degree polynomial trendlines, and the risk of obtaining misleading predictions.

#### Section 2

- Know how to calculate the measures of central tendency of data:
  - Mean,
  - median,
  - mode.
- Know how to use the histogram to see if a numeric dataset is distributed symmetrically or skewed.
- Know how to use Pearson's empirical formula which connects the mean, median, and mode for moderately skewed distributions.
- Know how to calculate the measures of variability of data:
  - Range,
  - quartiles,



- general percentiles,
  - variance,
  - standard deviation.
- Know how to create, read, and interpret boxplots.

## Section 3

- Understand elementary (discrete) probability, and how to calculate the probabilities of discrete random events.
- Understand the difference between the probability and frequency of discrete random events.
- Know that with a large number of observations, the relative frequency of discrete random events converges to their predicted probability.
- Understand the difference between discrete and continuous probability.
- Know the Probability Density Function (PDF), and how to use it to calculate probabilities.
- Know how probability distributions are related to frequency distributions (histograms).
- Understand uniform and normal (Gaussian) probability distributions, and their applications.
- Know how to use spreadsheets to plot the graph of the PDF of the normal distribution.
- Know how to use spreadsheets to generate normally-distributed random numbers, and calculate frequencies of values in numeric datasets.
- Know how to plot the PDF alongside the frequency distribution in spreadsheets.
- Understand the role of the mean  $\mu$  and the standard deviation  $\sigma$  in the normal distribution.
- Know how to use the empirical rule (68-95-99.7 rule) for normally-distributed datasets, to quantify the distribution of values.
- Know how to use the Chebyshev theorem to quantify the distribution of values, for other frequency distributions other than the normal distribution.
- Understand skewness, how to calculate it in spreadsheets, and how to use it to measure the symmetry of frequency distributions.
- Know what kurtosis is, and how to evaluate the thickness of tails compared to the normal distribution.
- Know additional important probability distributions including the Bernoulli, Binomial, Poisson, Exponential, Gamma, Weibull, and others.

## Section 4

- Understand the Central Limit Theorem.
- Know the difference between sampling with and without replacement.
- Understand confidence intervals, and how they are used.
- Know that confidence intervals become wider as the confidence level increases.
- Know how to calculate confidence intervals in spreadsheets.
- Understand what it means for a causal relationship to be linear.
- Understand the difference between linear and nonlinear causal relationships.
- Understand the difference between positive and negative causal relationships.
- Understand the difference between linear and nonlinear regression.
- Know that linear regression includes linear and higher-degree polynomial trendlines.
- Understand the difference between simple and multiple linear regression, logistic regression.
- Know the five main assumptions of linear regression analysis.
- Know how to check linearity, normality, and homoskedasticity in practice.



- Know how to calculate residuals for linear and higher-degree polynomial trendlines.
- Know how to display and check the residual plot.
- Know what cluster analysis is, and know the main cluster analysis methods.
- Understand that a dataset may not be eligible for linear regression analysis, but individual clusters may be.
- Know that when data points are visually clustered in the scatter chart, then conditional formatting may be used to cluster the data.
- Understand that in some cases, data points may be clustered, but neither the scatter chart, residual plot, or histogram will reveal the fact.
- Know that when data is clustered, using one trendline for the whole dataset may lead to wrong predictions.

## Section 5

- Understand the concept of correlation of random variables.
- Calculate Pearson's coefficient of correlation  $R$  ( $R$ -value).
- Know that  $R$  is only defined for linear relationships.
- Use a correlation matrix to find out which quantities are correlated.
- Visualize correlation graphically via heatmaps.
- Use the coefficient of determination  $R^2$  as a measure of goodness of fit.
- Understand the differences of using  $R^2$  vs.  $R$ .
- Understand multiple linear regression, and when it is used.
- Understand the assumptions of multiple linear regression.
- Identify multicollinearity of independent variables in multiple linear regression.
- Perform multiple linear regression.
- Understand logistic regression, and what types of models it is used for.
- Understand the assumptions of logistic regression.
- Perform logistic regression.
- Recognize when the results of logistic regression are wrong.
- Make a prediction of the survival of Titanic passengers.

## Section 6

- Sample (empirical) mean and population (true) mean.
- Alternative (research) hypothesis  $H_1$  and null hypothesis  $H_0$ .
- Why  $H_1$  should never contain equality.
- The role of the inequality in  $H_1$ , one-tailed and two-tailed hypothesis tests.
- P-value as the probability of  $H_0$  being true.
- Significance level  $\alpha$ .
- Type I and type II errors.
- One-tailed and two-tailed hypothesis tests.
- T-test for means of small samples.
- Independent, (dependent) paired, and one-sample T-test.
- F-test for variances.
- ANOVA for means of three or more samples.
- Z-test for means of large samples.



- Chi-squared tests for categorical variables.
  - Parametric vs. non-parametric hypothesis tests.
  - Using Chi-squared tests for goodness of fit, independence, and homogeneity.
  - Significance testing for linear regression models.
- 

## Advanced Spreadsheets

### Unit 1

#### Section 1: Spreadsheet Fundamentals Review and Lookup Functions

- Review useful keyboard shortcuts.
- Review Boolean values, IF and IFS functions, and wildcards.
- Review text strings and commonly used text functions.
- Review the functions INDEX and MATCH.
- Review how to use the functions INDEX and MATCH to look up data.
- Look up data with the function LOOKUP.
- Understand the limitations and appropriate use of the function LOOKUP.
- Look up data with the functions VLOOKUP and HLOOKUP.
- Compare and contrast when VLOOKUP and HLOOKUP can be used.
- Understand the limitations of VLOOKUP and HLOOKUP.
- Look up data with the function XLOOKUP.
- Utilize all parameters of the function XLOOKUP including search and match modes.
- Combine functions LOOKUP, HLOOKUP, VLOOKUP, and XLOOKUP.

#### Section 2: Named Ranges and Named Functions

- Define named ranges.
- Increase readability and decrease errors with named ranges.
- Identify named ranges in a spreadsheet.
- Edit existing named ranges.
- Use cut and copy functions appropriately with named ranges.
- Incorporate named ranges into built-in functions.
- Define named functions.
- Use the function help menu for built-in and named functions.
- Understand the importance of meaningful function and parameter names.
- Identify named functions in the spreadsheet.
- Create custom named functions.
- Utilize named functions.
- Combine named functions with named ranges.
- Import named functions into another spreadsheet.

### Section 3: Pivot Tables and Slicers

- Identify pivot tables.
- Utilize pivot tables to gain information from data.
- Use known cell, row, and column formatting and manipulation to modify pivot tables.
- Generate simple pivot tables with a single field for rows, columns, values, and/or filters.
- Generate complex pivot tables with multiple fields for rows, columns, values, and/or filters.
- Modify the way values are displayed in the pivot table.
- Add fields to pivot table sections in multiple ways.
- Use suggested pivot tables.
- Compare and contrast the level of information gained from simple versus complex pivot tables.
- Access the detailed view of a single value in a pivot table.
- Access a value from a pivot table using the GETPIVOTDATA function.
- Use one or more slicers to filter data in a pivot table.
- Compare and contrast the use of pivot table filters and slicers.
- Recognize known Google Sheets bugs when utilizing multiple slicers.

### Section 4: Data Cleanup tools and the QUERY Function

- Identify suggested cleanup steps and associated cells.
- Use Google Sheets built-in data cleanup tools.
- Define the QUERY function and understand its uses.
- Identify similarities to SQL within the QUERY function

### Section 5: Macros

- Define macros and understand their uses.
- Understand the limitations of using macros in the NCLab desktop.
- Record a new macro.
- Utilize a macro.
- Import a macro.
- Manage macros.

---

## DA Excel Capstone

Guided spreadsheet project.

# Introduction to Dashboards

## Unit 1

### Section 1: Introduction to Dashboards

- Define what a dashboard is and how dashboards are used.
- Understand the difference between static and dynamic dashboards.
- Identify commonly used dashboard software.
- Define redundant and duplicate data and understand the impact they have on data analysis and dashboard building.
- Use existing dashboards to gather information and identify insights into data.
- Compare and contrast the four purposes of a dashboard: strategic, analytical, operational, and tactical.
- Review sensitive data and the legal protections on data.
- Use various spreadsheet functions to mask and de-identify sensitive data.
- Identify common elements of all dashboards.
- Define and use various design elements to ensure dashboards are visually appealing.
- Define a dashboard's clarity, concentration, and control and understand why each of these elements is important.
- Understand the limitations of dashboards.

### Section 2: Data Preparation for a Dashboard

- Read a data dictionary as a way to understand the structure and nature of data.
- Recognize that data that is to be used for a dashboard is not always immediately ready for use.
- Profile, clean, and prepare data using a variety of functions.
- Classify data using IF, IFS, VLOOKUP, and INDEX MATCH functions.
- Initially analyze data using COUNT, COUNTIF, COUNTIFS, COUNTUNIQUE, COUNTBLANK, and COUNTA functions.
- Define imputation and understand when it's appropriate to impute missing data.
- Use the TREND function to impute missing linear data.
- Review the difference between AVERAGE and AVERAGEIF.
- Define and identify valid data.
- Review and utilize the many types of descriptive statistics.
- Review how to tell if standard deviation is appropriate to use and calculate standard deviation.

### Section 3: Building a Static Dashboard

- Build a static dashboard from start to finish.
- Understand the importance of forethought and planning when building a dashboard.
- Create a wireframe based on dashboard requirements and intended dashboard use.
- Extend a wireframe to create a mockup.

- Compare and contrast the intended use of and what is contained in a wireframe and mockup.
- Understand the importance of consistent style and formatting choices.
- Utilize a style guide to make formatting choices.
- Use cell notes to explain cell values.
- Apply knowledge of various charts and graphs to determine which would most clearly illustrate data.
- Revisit data preparation and aggregation based on needs of the dashboard.
- Iterate on previously created charts and visualizations.

## Section 4: Building a Dynamic Dashboard

- Build a dynamic dashboard from start to finish.
- Hide and reveal sheets as needed to protect data and reduce spreadsheet clutter.
- Review data validation and drop-downs.
- Create drop-downs in two ways.
- Use multiple sheets and functions to make troubleshooting and debugging easier.
- Use the TRANSPOSE function to work with rows and columns simultaneously.
- Combine FILTER functions with drop-downs to create dynamic subsets of data.
- Use data point formatting on a chart with dynamic data.
- Create and use checkboxes for Boolean conditions in functions.
- Review text concatenation to create dynamic text strings.
- Combine INDEX and MATCH functions with drop-downs to look up data based on dynamic selections.
- Compare and contrast the use of alternating colors and conditional formatting.
- Replicate alternating colors for a dynamic table using conditional formatting.
- Understand how Google Sheets applies and activates conditional formatting rules.
- Rearrange conditional formatting rules.
- Combine FILTER functions and drop-downs to create dynamic pivot tables.
- Review the limitations of slicers in the visual representation of a spreadsheet.
- Apply consistent formatting to an entire dashboard.

## Section 5: Guided Project

- Apply the concepts learned to generate a unique dynamic dashboard from scratch using a given dataset and guidelines.
- Protect sheets and cell ranges.
- Compare and contrast the various methods of sharing Google Sheets with other users.
- Update sharing permissions appropriately.
- Incorporate feedback and suggestions.
- Explain the process of building a dashboard in writing.

---

## DA Sheets Capstone

Guided dashboard project.



## DA Tableau Capstone

Guided dashboard project.

---

## DA Power BI Capstone

Guided dashboard project.

---

## CompTIA Data+ Exam Prep Course [Optional]

This course uses several practice tests in preparation for the CompTIA Data+ exam.