# Fundamentals of Data Analytics – Syllabus

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\*\*Fundamentals of Data Analytics - 15-Week Syllabus\*\*  
  
\*\*Course Objectives:\*\* Understand core data analytics concepts, perform data cleaning & preprocessing, analyze data using statistical and computational techniques, create insightful visualizations, and make data-driven decisions using Excel, Python, and SQL.  
  
  
\*\*Week 1: Introduction to Data Analytics\*\*  
\* Main Topic: What is Data Analytics? Types of Data Analytics.  
\* Subtopics: The data analytics process, Descriptive, Predictive, Prescriptive Analytics, Data Sources.  
\* Activity: Introduction Quiz & Discussion on Data Analytics Applications.  
  
  
\*\*Week 2: Data Wrangling with Excel I\*\*  
\* Main Topic: Data Cleaning and Preprocessing in Excel.  
\* Subtopics: Importing data, Handling missing values, Data transformation (e.g., standardization, normalization), Data validation.  
\* Activity: Excel Lab: Cleaning and transforming a real-world dataset.  
  
  
\*\*Week 3: Data Wrangling with Excel II\*\*  
\* Main Topic: Data manipulation and aggregation in Excel.  
\* Subtopics: Pivot Tables, VLOOKUP/HLOOKUP, Data Filtering, Conditional Formatting.  
\* Activity: Excel Lab: Building interactive dashboards and reports.  
  
  
\*\*Week 4: Introduction to SQL\*\*  
\* Main Topic: Relational Databases and SQL Basics.  
\* Subtopics: Database concepts (tables, relations, keys), SELECT, FROM, WHERE clauses, Basic data manipulation.  
\* Activity: SQL Lab: Simple queries on a sample database.  
  
  
\*\*Week 5: Advanced SQL\*\*  
\* Main Topic: Advanced SQL Queries and Data Manipulation.  
\* Subtopics: JOIN operations (INNER, LEFT, RIGHT, FULL), Aggregate functions (COUNT, SUM, AVG, MIN, MAX), GROUP BY and HAVING clauses.  
\* Activity: SQL Lab: Complex queries and data aggregation.  
  
  
\*\*Week 6: Introduction to Python for Data Analysis I\*\*  
\* Main Topic: Python Setup and Basic Data Structures.  
\* Subtopics: Installing Anaconda/Python, Introduction to Jupyter Notebooks, Lists, Dictionaries, Tuples.  
\* Activity: Python Lab: Basic data manipulation using lists and dictionaries.  
  
  
\*\*Week 7: Introduction to Python for Data Analysis II\*\*  
\* Main Topic: NumPy and Pandas for Data Manipulation.  
\* Subtopics: NumPy arrays, Pandas DataFrames, Data cleaning and preprocessing using Pandas.  
\* Activity: Python Lab: Data manipulation using NumPy and Pandas.  
  
  
\*\*Week 8: Data Visualization with Python\*\*  
\* Main Topic: Creating effective data visualizations using Matplotlib and Seaborn.  
\* Subtopics: Different chart types (bar charts, histograms, scatter plots, etc.), Customization of plots, Effective data visualization principles.  
\* Activity: Python Lab: Creating visualizations from a dataset.  
  
  
\*\*Week 9: Descriptive Statistics\*\*  
\* Main Topic: Measures of Central Tendency and Dispersion.  
\* Subtopics: Mean, median, mode, variance, standard deviation, percentiles.  
\* Activity: Quiz on descriptive statistics and Excel/Python exercise.  
  
  
\*\*Week 10: Inferential Statistics I\*\*  
\* Main Topic: Hypothesis Testing and Confidence Intervals.  
\* Subtopics: t-tests, z-tests, p-values, confidence intervals.  
\* Activity: Case study involving hypothesis testing.  
  
  
\*\*Week 11: Inferential Statistics II\*\*  
\* Main Topic: Regression Analysis.  
\* Subtopics: Linear regression, interpretation of coefficients, R-squared.  
\* Activity: Python Lab: Performing linear regression analysis.  
  
  
\*\*Week 12: Data Storytelling and Communication\*\*  
\* Main Topic: Communicating Data Insights Effectively.  
\* Subtopics: Creating effective presentations, conveying complex information clearly, visual communication best practices.  
\* Activity: Presentation of data analysis findings.  
  
  
\*\*Week 13: Case Study I: Business Analytics\*\*  
\* Main Topic: Applying Data Analytics to a Real-World Business Problem.  
\* Subtopics: Problem definition, data collection, analysis, and interpretation.  
\* Activity: Group case study and presentation.  
  
  
\*\*Week 14: Case Study II: Social Science Analytics\*\*  
\* Main Topic: Applying Data Analytics to a Real-World Social Science Problem.  
\* Subtopics: Problem definition, data collection, analysis, and interpretation.  
\* Activity: Group case study and presentation.  
  
  
\*\*Week 15: Final Project & Review\*\*  
\* Main Topic: Final Project Presentations & Course Review.  
\* Subtopics: Project feedback, course summary, and future learning.  
\* Activity: Final project presentations and Q&A.

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