# Fundamentals of Data Analytics – Lesson Plan

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\*\*Fundamentals of Data Analytics - 12-Week Lesson Plan (1-hour classes)\*\*  
  
\*\*Week 1: Introduction to Data Analytics & Data Types\*\*  
  
\* \*\*Topic:\*\* What is Data Analytics?  
\* \*\*Subtopics:\*\*  
 \* Definition and scope of data analytics.  
 \* Types of data analytics (descriptive, diagnostic, predictive, prescriptive).  
 \* The role of data analytics in decision-making.  
 \* Different types of data (numerical, categorical, ordinal, etc.).  
\* \*\*Activities:\*\* Introduction and discussion, short quiz on data types.  
  
  
\*\*Week 2: Data Cleaning and Preprocessing\*\*  
  
\* \*\*Topic:\*\* Data Wrangling  
\* \*\*Subtopics:\*\*  
 \* Identifying and handling missing values (imputation, removal).  
 \* Dealing with outliers.  
 \* Data transformation (scaling, normalization).  
 \* Data cleaning using Excel.  
\* \*\*Activities:\*\* Hands-on Excel exercise: cleaning a sample dataset with missing values and outliers.  
  
  
\*\*Week 3: Introduction to Python and Pandas\*\*  
  
\* \*\*Topic:\*\* Python for Data Analysis  
\* \*\*Subtopics:\*\*  
 \* Introduction to Python programming basics.  
 \* Installing Anaconda and Jupyter Notebook.  
 \* Introduction to Pandas: Series and DataFrames.  
 \* Importing and exporting data using Pandas.  
\* \*\*Activities:\*\* Setting up Python environment, basic Python and Pandas coding exercises.  
  
  
\*\*Week 4: Data Manipulation with Pandas\*\*  
  
\* \*\*Topic:\*\* Pandas Data Wrangling  
\* \*\*Subtopics:\*\*  
 \* Data filtering, sorting, and selection.  
 \* Data aggregation and grouping.  
 \* Data merging and joining.  
 \* Handling different data types within Pandas.  
\* \*\*Activities:\*\* Hands-on Pandas exercises: manipulating a sample dataset.  
  
  
\*\*Week 5: Exploratory Data Analysis (EDA) – Part 1\*\*  
  
\* \*\*Topic:\*\* Descriptive Statistics and Visualization  
\* \*\*Subtopics:\*\*  
 \* Summary statistics (mean, median, mode, standard deviation, etc.).  
 \* Data visualization using Matplotlib (histograms, box plots, scatter plots).  
\* \*\*Activities:\*\* Calculating summary statistics and creating visualizations using Python (Matplotlib) on a real-world dataset.  
  
  
\*\*Week 6: Exploratory Data Analysis (EDA) – Part 2\*\*  
  
\* \*\*Topic:\*\* Advanced Visualization Techniques  
\* \*\*Subtopics:\*\*  
 \* Data visualization using Seaborn (more advanced visualizations).  
 \* Interpreting visualizations to identify patterns and trends.  
\* \*\*Activities:\*\* Hands-on exercises with Seaborn, interpreting visualizations from a provided dataset.  
  
  
\*\*Week 7: Introduction to NumPy and Basic Statistics\*\*  
  
\* \*\*Topic:\*\* NumPy and Statistical Concepts  
\* \*\*Subtopics:\*\*  
 \* Introduction to NumPy arrays and operations.  
 \* Basic statistical concepts (probability distributions, hypothesis testing).  
\* \*\*Activities:\*\* NumPy array manipulation exercises, solving basic statistical problems.  
  
  
\*\*Week 8: Hypothesis Testing and Regression Analysis\*\*  
  
\* \*\*Topic:\*\* Inferential Statistics  
\* \*\*Subtopics:\*\*  
 \* t-tests, ANOVA.  
 \* Simple linear regression.  
\* \*\*Activities:\*\* Applying t-test and performing linear regression using Python (Statsmodels or Scikit-learn) on a sample dataset.  
  
  
\*\*Week 9: Introduction to SQL\*\*  
  
\* \*\*Topic:\*\* Database Management and SQL  
\* \*\*Subtopics:\*\*  
 \* Introduction to relational databases.  
 \* Basic SQL commands (SELECT, FROM, WHERE, JOIN).  
\* \*\*Activities:\*\* Practice SQL queries on a sample database (e.g., using SQLite or an online SQL editor).  
  
  
\*\*Week 10: Advanced SQL and Data Joining\*\*  
  
\* \*\*Topic:\*\* Working with Databases  
\* \*\*Subtopics:\*\*  
 \* Advanced SQL queries (GROUP BY, HAVING, subqueries).  
 \* Different types of joins (inner, outer, left, right).  
\* \*\*Activities:\*\* More advanced SQL exercises focusing on joining tables and complex queries.  
  
  
\*\*Week 11: Data Visualization and Reporting (Optional: Power BI/Tableau)\*\*  
  
\* \*\*Topic:\*\* Communicating Insights  
\* \*\*Subtopics:\*\*  
 \* Creating dashboards and reports (introduction to Power BI or Tableau – optional).  
 \* Effective data communication techniques for technical and non-technical audiences.  
\* \*\*Activities:\*\* Optional: Creating a simple dashboard using Power BI or Tableau; otherwise, focus on creating effective visualizations and report writing.  
  
  
\*\*Week 12: Ethics and Future Trends in Data Analytics\*\*  
  
\* \*\*Topic:\*\* Ethical Considerations and the Future  
\* \*\*Subtopics:\*\*  
 \* Ethical considerations in data collection, use, and privacy (GDPR, etc.).  
 \* Future trends and career paths in data analytics.  
\* \*\*Activities:\*\* Discussion on ethical dilemmas, career exploration activity.  
  
  
This plan provides a flexible framework. The instructor can adjust the depth and focus of each week based on student progress and available time. Real-world datasets should be used throughout the course to enhance practical application.

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