# Fundamentals of Data Analytics – Syllabus

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## Fundamentals of Data Analytics - 15-Week Syllabus  
  
\*\*Course Objectives:\*\* Students will understand key data analytics concepts, clean and preprocess data, perform EDA, apply basic statistical methods, utilize relevant software (Excel, Python, SQL), potentially build dashboards, and communicate insights ethically.  
  
  
\*\*Week 1: Introduction to Data Analytics\*\*  
\* Main Topic: What is Data Analytics? Its role in decision-making. Types of Data.  
\* Subtopics: Descriptive, Predictive, Prescriptive Analytics. Data Sources. Big Data concepts.  
\* Activity: Introduction quiz, discussion on real-world data analytics applications.  
  
  
\*\*Week 2: Data Wrangling I - Data Cleaning and Preprocessing in Excel\*\*  
\* Main Topic: Data Cleaning Techniques. Handling Missing Values.  
\* Subtopics: Identifying and dealing with outliers, data transformation (standardization, normalization). Data types and validation.  
\* Activity: Excel-based lab: Cleaning a messy dataset.  
  
  
\*\*Week 3: Data Wrangling II - Python for Data Cleaning\*\*  
\* Main Topic: Introduction to Python for Data Analysis (Pandas, NumPy). Data Importing and Exporting.  
\* Subtopics: Data manipulation with Pandas (filtering, sorting, merging). Handling missing values in Python. Data type conversions.  
\* Activity: Python lab: Cleaning a dataset using Pandas.  
  
  
\*\*Week 4: Exploratory Data Analysis (EDA) I - Descriptive Statistics\*\*  
\* Main Topic: Summarizing Data using descriptive statistics. Measures of central tendency and dispersion.  
\* Subtopics: Mean, median, mode, variance, standard deviation, percentiles. Frequency distributions.  
\* Activity: In-class exercise calculating descriptive statistics on a given dataset.  
  
  
\*\*Week 5: EDA II - Data Visualization in Python\*\*  
\* Main Topic: Creating insightful visualizations using Matplotlib/Seaborn.  
\* Subtopics: Histograms, box plots, scatter plots, bar charts. Choosing appropriate visualizations.  
\* Activity: Python lab: Creating visualizations for a dataset.  
  
  
\*\*Week 6: EDA III - Data Visualization in Excel\*\*  
\* Main Topic: Creating visualizations in Excel.  
\* Subtopics: Charts and graphs in Excel. Interpreting visualizations.  
\* Activity: Excel-based lab: Creating visualizations from a dataset.  
  
  
\*\*Week 7: Introduction to SQL\*\*  
\* Main Topic: Introduction to SQL, basic queries.  
\* Subtopics: SELECT, FROM, WHERE clauses. Data filtering and retrieval.  
\* Activity: SQL lab: Writing basic SQL queries to extract data.  
  
  
\*\*Week 8: SQL - Joins and Aggregations\*\*  
\* Main Topic: Joining tables, group by and aggregate functions.  
\* Subtopics: INNER JOIN, LEFT JOIN, RIGHT JOIN. SUM, AVG, COUNT, MIN, MAX.  
\* Activity: SQL lab: Working with multiple tables and aggregate functions.  
  
  
\*\*Week 9: Basic Statistical Methods I - Hypothesis Testing\*\*  
\* Main Topic: Introduction to hypothesis testing. T-tests and Z-tests.  
\* Subtopics: Null and alternative hypotheses. p-values. Type I and Type II errors.  
\* Activity: Case study analyzing a hypothesis testing scenario.  
  
  
\*\*Week 10: Basic Statistical Methods II - Correlation and Regression\*\*  
\* Main Topic: Correlation analysis, linear regression.  
\* Subtopics: Correlation coefficient. Simple linear regression model. Interpretation of regression output.  
\* Activity: Python lab: Performing correlation and regression analysis on a dataset.  
  
  
\*\*Week 11: Data Storytelling and Communication I\*\*  
\* Main Topic: Communicating data insights effectively.  
\* Subtopics: Creating effective presentations. Tailoring communication to different audiences.  
\* Activity: Presentation preparation on a chosen dataset analysis.  
  
  
\*\*Week 12: Data Storytelling and Communication II\*\*  
\* Main Topic: Presenting data findings.  
\* Subtopics: Visualizing key insights. Storytelling techniques.  
\* Activity: In-class presentations and peer feedback.  
  
  
\*\*Week 13: Ethical Considerations in Data Analytics\*\*  
\* Main Topic: Data privacy, bias in algorithms, responsible data use.  
\* Subtopics: Ethical implications of data analysis. Data security and privacy regulations.  
\* Activity: Class discussion and ethical dilemma case study.  
  
  
\*\*Week 14: Introduction to Dashboarding (Optional)\*\*  
\* Main Topic: (Optional) Building dashboards using Power BI or Tableau.  
\* Subtopics: (Optional) Creating interactive dashboards. Data visualization best practices for dashboards.  
\* Activity: (Optional) Lab: Creating a simple dashboard using Power BI or Tableau.  
  
  
\*\*Week 15: Final Project Presentations and Wrap-up\*\*  
\* Main Topic: Final project presentations and course review.  
\* Subtopics: Course summary. Q&A.  
\* Activity: Final project presentations. Final exam (optional).

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