NumPy for Data Analytics: 1-Week Plan

Day 1: NumPy Basics + Array Creation

Tasks:
- Install NumPy
- Learn about arrays, differences from Python lists
- Create 1D, 2D arrays manually and using functions

Resources:
- NumPy Docs - Quickstart: https://numpy.org/doc/stable/user/quickstart.html
- Video: NumPy Crash Course (freeCodeCamp): https://www.youtube.com/watch?v=QUT1VHiLmmI

Practice:
- Create arrays using np.array(), np.arange(), np.linspace(), np.zeros(), and np.ones()

Day 2: Array Indexing & Slicing

Tasks:
- Learn how to access and modify elements
- Use slicing and boolean indexing
- Work with multidimensional arrays

Resources:
- W3Schools NumPy Indexing: https://www.w3schools.com/python/numpy/numpy_array_indexing.asp
- NumPy Cheat Sheet (DataCamp)

Practice:
- Extract rows, columns, and elements
- Apply conditions to filter values (arr[arr > 50])

Day 3: Array Math & Broadcasting

Tasks:
- Perform element-wise operations
- Use NumPy's built-in math functions
- Learn about broadcasting rules

Resources:
- Real Python - NumPy Math: https://realpython.com/numpy-array-programming/
- YouTube: Element-wise operations explained

Practice:
- Add, subtract, multiply arrays
- Normalize a dataset using broadcasting

Day 4: Descriptive Statistics with NumPy

Tasks:
- Use NumPy for statistical analysis
- Calculate mean, median, std, min, max, etc.
- Understand axis parameter for multi-dimensional analysis

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Resources:
- NumPy Statistical Functions: https://numpy.org/doc/stable/reference/routines.statistics.html

Practice:
- Analyze a sample dataset: calculate basic stats row-wise and column-wise

Day 5: Reshaping, Stacking & Splitting

Tasks:
- Reshape arrays (reshape, flatten)
- Stack arrays vertically/horizontally
- Split arrays

Resources:
- W3Schools Reshaping: https://www.w3schools.com/python/numpy/numpy_array_reshape.asp
- Towards Data Science Reshape Guide

Practice:
- Stack and reshape 2D arrays
- Convert real-life data (e.g., temperature or sales) into matrix form

Day 6: Random, Simulation & Practical Analytics

Tasks:
- Use np.random for simulations
- Generate distributions (normal, uniform)
- Analyze random data

Resources:
- NumPy Random Docs: https://numpy.org/doc/stable/reference/random/index.html
- Kaggle Beginner Dataset: https://www.kaggle.com/datasets/

Practice:
- Simulate a dice roll or coin toss experiment
- Analyze a randomly generated dataset (mean, variance, histogram)

Day 7: Mini Project + Review

Tasks:
- Review everything you've learned
- Work on a small project: Analyze student scores or simulate sales data

Project Ideas:
- Simulate exam scores for 100 students
- Calculate average, max, pass/fail, and visualize using matplotlib

Resources:
- Jupyter Notebook or Google Colab
- Mini Project Example: https://github.com/firmai/numpy-pandas/blob/master/Numpy.ipynb