CSI Python SIG

🖥️8 Days Roadmap

Day 1 – Introduction to Python

- Overview of Python
- Installation & Environment Setup
- Python IDEs: IDLE, VS Code, PyCharm
- **Python Basics**
    - Variables & Data Types
    - Input/Output operations
    - Arithmetic & Logical operators
- **Control Flow**
    - If-else statements

Day 2 – Loops & Functions

- **Loops**: `for`, `while`, Nested loops
- **Functions**
    - Defining & Calling
    - Parameters & Return values
    - Built-in functions

Day 3 – Data Structures (Part 1)

- **Lists & Tuples**
    - Creating & manipulating lists
    - List comprehension
    - Differences between lists & tuples
- **Dictionaries & Sets**
    - Key-value pairs in dictionaries
    - Set operations

Day 4 – Strings, Files & Libraries

- **String Manipulation**
  - Slicing, Formatting, Built-in methods
- **File Handling**
  - Reading/Writing files
  - Error handling (`try-except`)
- **Introduction to Libraries**
  - `math`, `random`, `datetime`
  - Simple plotting with `matplotlib`

Day 5 – OOP & Modules

- **Object-Oriented Programming**
  - Classes & Objects
  - Constructors & Methods
  - Inheritance & Polymorphism
- **Modules & Packages**
  - Creating & Importing Modules
  - Intro to Python Packages

Day 6 – Introduction to Data Science

- **NumPy (Numerical Python)**
  - Arrays vs Lists
  - Array operations (vectorization, broadcasting)
  - Useful functions: `np.array()`, `np.arange()`, `np.mean()`, `np.reshape()`
- **Pandas (Data Manipulation & Analysis)**
  - Series & DataFrame
  - Reading data (`read_csv`, `read_excel`)
  - Data Cleaning (missing values, duplicates)
  - Data Selection (`loc`, `iloc`)
  - Aggregations (`groupby`, `describe`)
- **Data Visualization**
  - Simple plots with `matplotlib`
  - Bar charts, line plots, histograms

Day 7 – Introduction to Machine Learning

- **What is ML?**

    - ML vs Traditional Programming
    - Applications: Recommendation Systems, Spam Filters, Predictive Models
- **Supervised Learning**
    - Data with labels (input → output)
    - Algorithms: Linear Regression, Logistic Regression, Decision Trees, SVM
    - Example: Predicting house prices
- **ML Workflow**
    - Data Collection → Preprocessing → Model Training → Evaluation → Deployment

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Day 8 – Unsupervised Learning

- **Data without labels**
- **Algorithms**:
    - K-Means Clustering
    - Hierarchical Clustering
    - Principal Component Analysis (PCA)
- **Example**: Customer segmentation in marketing

Generative AI and Agentic AI part will be added soon…..