Day 1 – Introduction & Setup

- Welcome, course goals, and expectations
- **Bioinformatics primer**: Central Dogma (DNA → RNA → Protein) and applications in health tech
- Installing **Python**, **Anaconda**, and understanding **Google Colab** (main platform)
- Running your first Python script in Colab
- Quick intro: What is a **Python library** and why do we use them?

Day 2 – Python Basics for Bioinformatics

- Python data types (strings, numbers, lists, dictionaries)
- Loops and conditionals (if/else, for/while)
- Functions: writing and reusing code
- Importing libraries (Pandas, Biopython basics)
- *Mini-task:* Write your first **"Hello Bioinformatics!"** program
- *Mini-project:* **DNA Base Counter** – count nucleotides from a FASTA file

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Day 3 – Working with Biological Data

- Understanding file formats: FASTA and CSV
- Reading and parsing sequence files
- Using **Biopython** for sequence operations
- *Hands-on Project:* **GC Content Calculator** – extract DNA sequences & calculate GC %
- Application in health tech: mutations, genetic markers, and diagnostics

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Day 4 – Version Control with GitHub

- Why researchers & coders use GitHub (collaboration, version control, portfolio)
- Creating a GitHub account
- Uploading your first script (DNA Counter) to GitHub
- *Mini-project:* Share your **GC Content Calculator** on GitHub

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Day 5 – Introduction to Streamlit (App Development Basics)

- What is Streamlit & why it's perfect for bioinformatics tools
- Setting up your **first Streamlit app**
- Adding text, inputs, and file uploads

- *Mini-project:* Build a **DNA Base Counter App** (interactive version of Day 2 project)

Day 6 – Making Apps Interactive

- Adding buttons, sliders, and user inputs
- Displaying results dynamically
- Uploading FASTA files and showing results in tables
- *Mini-project:* **Mutation Finder Tool** – search for specific sequences/mutations

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Day 7 – Data Visualization in Bioinformatics Apps

- Why visualization matters in biology & medicine
- Using **Matplotlib/Plotly** in Streamlit
- Visualizing DNA/protein sequence lengths (histograms)
- Color-coding mutations in sequence data
- *Mini-project:* **GC Content Visualizer**

Day 8 – Bioinformatics Use Case Design

- Case studies: genomics, diagnostics, personalized medicine
- Mapping **real-world problems** to **app features**
- Workshop: Design your **own app idea**
- *Activity:* Pitch your app concept to peers

Day 9 – Building Your Custom App

- Structuring your Streamlit app (best practices)
- Importing and cleaning datasets
- Adding interactivity & visualizations
- Styling and branding your app (make it professional)
- Debugging tips
- *Mini-project:* Begin building **your custom app**

Day 10 – Demo Day & Next Steps

- Each participant demos their custom app

- Peer and mentor feedback
- Certificates of Participation & Innovation Awards
- What's next?
    - More advanced Python libraries (scikit-learn, NumPy)
    - Cloud deployment (Streamlit Cloud, Hugging Face Spaces)
    - Continuing your GitHub portfolio