AI and Biotechnology/Bioinformatics
R Crash Course (Batch I)
16Th May – 06 June, 2025

Event Calendar				16 May **Session 1** R Basics	17 May **Session 2** R Basics	18 May **Session 3** R Basics
19 May	20 May	21 May	22 May **Deadline** Assignment 1	23 May **Session 4** Exploratory Data Analysis	24 May **Session 5** Data Manipulation	25 May **Session 6** Statistical Analysis
26 May	27 May	28 May	29 May **Deadline** Assignment 2	30 May **Session 7** Statistical Analysis	31 May **Session 8** Data Visualization	01 June **Session 9** Data Visualization
02 June	03 June	04 June	05 June **Deadline** Assignment 3	06 June **Session 10** Recap Hands-on mini project		

Course Breakdown

Session 1: Getting Started with R

- Installing R and RStudio
- Setting the working directory
- Creating an R project
- Intro to RStudio interface

Session 2: Syntax and Basics of R

- R Syntax essentials
- Variables (numeric, character, logical)
- Comments and Keywords
- Operators (arithmetic, relational, logical)

Session 3: Data Types & Data Structures

- Data types: numeric, character, logical, factor
- Data structures: vectors, matrices, lists, data frames
- Indexing and sub setting

Session 4: Importing and Exploring Data

- Import and read data in R
- Intro to dataExplorer package
- Data assessment, summary
- Identify and handle missing values

Session 5: Data Manipulation with Base R and dplyr

- Filtering, selecting, and arranging
- Creating new variables
- Summarizing groups
- Combining datasets

Session 6: Descriptive and Inferential Statistics

- Mean, median, standard deviation, range
- Frequency tables
- Normality checks: histograms, QQ plots

Session 7: Hypothesis Testing & Correlation

- T-test
- Correlation
- Apply tests to clinical or biological conditions

Session 8: Visualizing Data (Base R & ggplot2 - Part I)

- ggplot2 syntax basics
- Boxplots
- Histograms
- Bar plots
- Scatter plots

Session 9: Advanced Plots & Visualization

- Heatmaps
- PCA plots
- Volcano plots
- Kaplan-Meier survival curves

Session 10: Recap + Mini Project

- Final mini project end-to-end analysis
- Recap of key concepts
- Q&A and course wrap-up