



# Course Contents

Prepared by : Bioinfo Cloud Team





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# **Key Activities**

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Workshops on different bioinformatics course in online and offline mode

Hands on training program

Customized Data Analysis

Research Consultant



# Why to choose Bioinfo Cloud?

### Cost Effectiveness

#### On Job Practical Training

Quality Learning Certified Institution

Experienced Teachers Theoretical + Hands on

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# Biostatistics

- Measures describing the central tendency distributions- average, median, mode
- Measures of dispersion: Dispersion, Range, standard deviation
- **Probability**: Normal distribution and properties.
- Parametric test: t-test (Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way).
- **Correlation**: Definition, Karl Pearson's coefficient of correlation.
- **Regression modelling**: Hypothesis testing in Simple and Multiple regression models
- **Graphs**: Histogram, Pie Chart, Cubic Graph.
- Statistical Analysis Using Excel, SPSS, Graph pad prism.
- Basic fundamentals of molecular biology used in bioinformatics





# Fundamental Of Bioinformatics

- Fundamentals of Molecular biology used in bioinformatics
- Biological Databases: Nucleotide/ Genome Databases (GenBank, EMBL, DDBJ), Protein Sequence Database (Uniprot-KB: SWISS-PROT), Structure databases (PDB, NDB, PubChem). Sequence file formats: Various file formats for bio-molecular sequences: GenBank, FASTA, GCG, MSF etc.
- Sequence Analysis: Basic concepts of sequence similarity, identity and homology, definitions of homologues, orthologues, paralogues and xenologues
- Scoring matrices, PAM and BLOSUM,
  Sequence alignment: Measurement of sequence similarity; Similarity and homology.
- Pairwise sequence alignment: Basic concepts of sequence alignment, pairwise alignments for analysis of Nucleic acid and protein sequences and interpretation of results.

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### Basic tools and popular software in Bioinformatics

- Primer designing for PCR, RT PCR, Molecular Marker
- Pair-wise alignment and Multiple sequence alignment; ClustalW
- Phylogenetic analysis; MEGA
- Dot Plot
- TB tool

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- Use of in-sequence manipulation Bioedit
- Motif analysis: MEME





### Bioinformatics Programming Languages

- Advanced R: Building upon foundational R skills, you'll explore advanced data manipulation, visualization techniques, and statistical analyses tailored specifically for bioinformatics applications. Topics may include genomic data analysis and statistical modelling.
- Perl / Bioperl: Perl has long been a staple in bioinformatics due to its text-processing capabilities and extensive bioinformatics libraries like Bioperl. You'll learn how to parse and manipulate biological sequences efficiently.
- **Python / Biopython**: Python's versatility and readability make it increasingly popular in bioinformatics. With Biopython, you'll harness powerful libraries for sequence analysis, & sequence manipulation. You'll also explore tools for data analysis, & visualization used in bioinformatics.
- Machine Learning: Artificial Intelligence (ML-AI): ML techniques are crucial in extracting meaningful patterns from large biological datasets. You'll learn about supervised and unsupervised learning algorithms, feature selection, and model evaluation.







# NGS Data Analysis

- Introduction Genomics Bioinformatics
- Basic Understanding of different NGS platforms
- LINUX Operating System: Overview of Linux Architecture and Basic Commands
- Basics of genome assembly and annotation
- Quality Check of data using fastqc
- Interpretation of NGS Data
- **RNAseq analysis:** Alignment or Mapping, Differential Gene Expression (DEGs)



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# Bioinformatics for Molecular Breeding

- Basic concept of molecular marker and QTL mapping
- Various Molecular Diversity analysis
- Molecular marker data handling
- SNP data analysis
- Genome-wide association studies (GWAS) with TASSEL and GAPIT in R
- Haplotype analysis
- Basic of R and data analysis
- Data representation and interpretation



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Research Data Pre-processing, Analysis, Interpretation and Manuscript Writing: A Comprehensive Guide

- Biostatistics
- Data analysis and visualization tools: Various designs: CRD, RBD, Factorial ANOVA, DMRT.
- EXCEL
- R
- IBM-SPSS
- GRAPH PAD PRISM
- Data interpretation
- Research paper writing

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#### **Batches Begins Soon!!**



## Admissions Open



