



COURSE SYLLABUS & FEES · 2026

Certificate Course in Bioinformatics (CCBI) in Pune

iLearn CRI's 3-month Bioinformatics course in Pune covers biological databases, sequence alignment, NGS analysis, genomics, and proteomics — combining life sciences with computation and data analysis for biotech and pharma careers.

DURATION	MODE	FEES	EMI
3 months	Live online & classroom (Pune)	₹40,000 + 18% GST	Available

Eligibility

B.Sc / M.Sc in Biotechnology, Bioinformatics, or Life Sciences
B.Sc / M.Sc in Microbiology, Genetics, or Biochemistry
B.Pharm, M.Pharm graduates with biology background
Graduates with basic biology knowledge at degree level

Complete syllabus, module by module

01 Fundamentals of Biology

Cell biology: cell structure, organelles, and function
Molecular biology: DNA, RNA, protein synthesis
Genetics: Mendelian inheritance, mutations, and gene expression
Central dogma and its implications for bioinformatics
Introduction to omics: genomics, transcriptomics, proteomics

02 Bioinformatics Databases & Tools

NCBI: GenBank, PubMed, RefSeq, and database navigation
BLAST: sequence similarity searching and result interpretation
UniProt, PDB, and protein structure databases
Ensembl and genome browser tools
Biological ontologies: Gene Ontology (GO) and KEGG pathways

03 Programming & Statistical Analysis

Python for bioinformatics: Biopython library and data manipulation
R for bioinformatics: Bioconductor packages and statistical analysis
Command-line Linux basics for bioinformatics pipelines
Statistical concepts: distributions, hypothesis testing, multiple testing correction
Data visualisation: heatmaps, volcano plots, principal component analysis (PCA)

04 Advanced & Specialized Modules

Introduction to machine learning concepts in bioinformatics
Network biology and pathway enrichment analysis
Comparative genomics and genome evolution
Drug target identification using bioinformatics approaches
Integrative multi-omics analysis overview

05 **Structural Bioinformatics**

Protein 3D structure: primary, secondary, tertiary, quaternary levels
Structure visualisation tools: PyMOL and UCSF Chimera
Homology modelling and structure prediction (AlphaFold)
Molecular docking basics for drug discovery
Structure-based drug design principles

06 **Sequence Alignment**

Pairwise alignment: global (Needleman-Wunsch) and local (Smith-Waterman)
BLAST algorithms: blastn, blastp, tblastx applications
Multiple Sequence Alignment (MSA): ClustalW, MUSCLE, MAFFT
Scoring matrices: PAM and BLOSUM
Alignment interpretation and biological significance

07 **Phylogenetics**

Evolutionary distance and nucleotide substitution models
Tree-building methods: Neighbour-Joining, maximum parsimony, maximum likelihood, Bayesian
Bootstrap analysis and tree confidence
Tools: MEGA, IQ-TREE, PhyML
Applications: molecular evolution, outbreak tracing, gene family analysis

08 **Next-Generation Sequencing (NGS)**

NGS platforms: Illumina, PacBio, Oxford Nanopore
NGS library preparation and sequencing chemistry
Quality control: FastQC and Trimmomatic
Read alignment: BWA, STAR, HISAT2
Variant calling and annotation: GATK, ANNOVAR
RNA-seq: differential expression analysis with DESeq2 and edgeR

09 **Genomics**

Genome assembly: de novo and reference-guided approaches
Genome annotation: gene prediction and functional annotation
Comparative genomics and syntenic analysis
Epigenomics: ChIP-seq and ATAC-seq overview
Genome-wide association studies (GWAS) principles

10 **Proteomics**

Mass spectrometry principles for proteomics
Protein identification and quantification workflows
Label-free and label-based quantitative proteomics
Post-translational modifications (PTMs) analysis
Proteomics data analysis tools: MaxQuant and Perseus
Integration of proteomics with genomics for systems biology

Career outcomes

ROLE	AVERAGE CTC
Bioinformatics Analyst	₹ 3.5–5.0 LPA
Genomics Data Analyst	₹ 4.0–6.0 LPA
Research Associate (Bioinformatics)	₹ 3.5–4.5 LPA
NGS Data Analyst	₹ 4.5–7.0 LPA
Senior Bioinformatics Scientist (3–5 yrs)	₹ 8.0–15.0 LPA

Placement support built in

100% placement assistance for every student: resume calibration, mock interviews with practicing professionals, and direct introductions to 50+ pharma & CRO hiring partners. Average starting CTC across placements: ₹4.2L. Separate live online and classroom batches — same curriculum, same fees, same support.

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iLearn Clinical Research Institute · Office No. 331, Metro Life Bizzbay Tathawade, Wakad, Maharashtra 411057 · Fees and batch details current as of August 2026; confirm with admissions before enrolling.