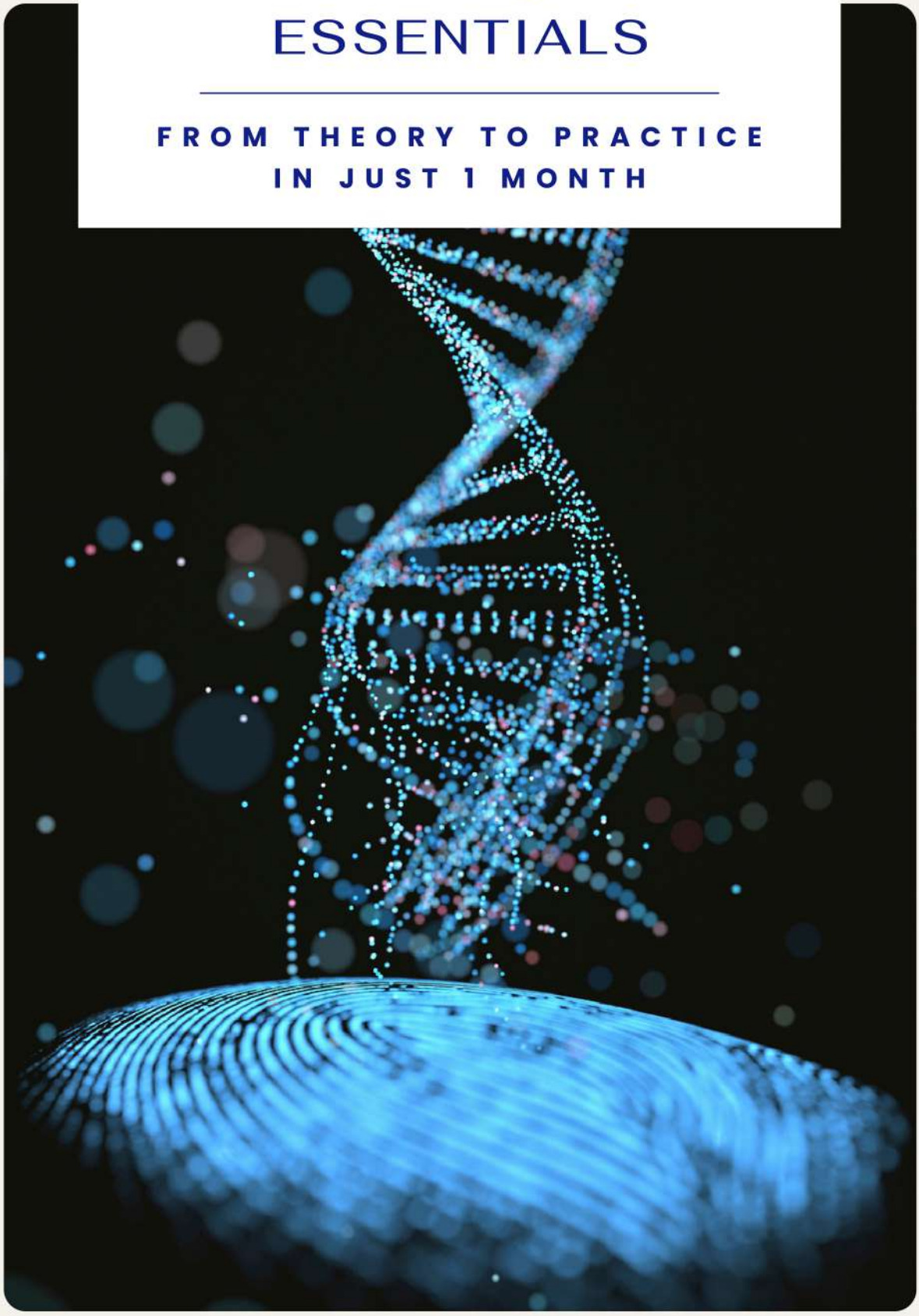
Dr.Omics Labs
The Doctor of your DNA

NEXT-GEN SEQUENCING ESSENTIALS

FROM THEORY TO PRACTICE IN JUST 1 MONTH



- Hands-on Online Live Training
- Research Publication Guidance
- HR guidance
- Industrial experts as faculty

YOUR GO TO

WITH DR.OMICS LABS

COMPREHENSIVE AND SPECIALIZED TRAINING

- MODULES COVERING KEY AREAS OF COMPUTAIONAL RESEARCH.
- HIGHLY PROFESSIONAL COURSES FOR NEXT GENERATION SEQUENCING DATA ANALYSIS TECHNIQUES & PROGRAMMING FROM BASICS

EXPOSURE

- INDUSTRY PRACTICES AND INSIGHTS INTO THE COMMERCIAL ASPECTS OF BIOTECH RESEARCH
- AN INDUSTRIAL LEVEL COURSE DESIGN.
- COVERING EVERY TOPIC REQUIRED FOR BEING A BIOINFORMATICIAN & PROVIDING HANDS-ON PRACTICE DURING SESSION

MENTORSHIP

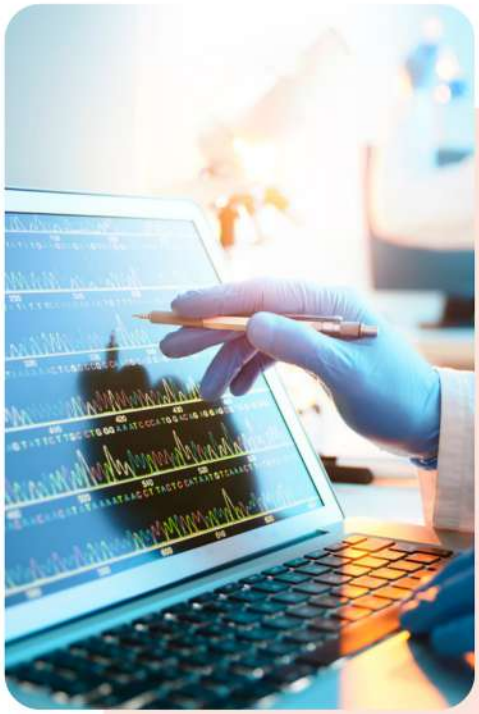
- BENEFIT FROM THE GUIDANCE OF EXPERIENCED GENETICISTS AND BIOINFORMATICIANS.
- LIVE LEARNING WITH HANDS-ON PRACTICAL EXPERIENCE, UNDERSTANDING USAGE OF BIOINFORMATICS DATABASES IN REAL-TIME.
- CREATION OF PIPELINES, DATA SORTING, TRIMMING AND CLEANING STUDIES.

NETWORKING

- CONNECT WITH PEERS, INDUSTRY PROFESSIONALS, AND POTENTIAL COLLABORATORS.
- A COLLABORATIVE AND INTERACTIVE LEARNING ENVIRONMENT THAT FOSTERS CREATIVITY AND INNOVATION.

Next-Gen Sequencing Research Oriented Course

"Explore the forefront of genomics and bioinformatics with our NGS Research Oriented Course at Dr.Omics labs. Gain hands-on expertise in next-generation sequencing techniques and data analysis, propelling your career or research to new heights in the field of genomics."



Important tip

Study at your own pace with 24/7 access to course materials, allowing you to balance your studies with your other commitments.

- Global Accessibility: Learn from anywhere in the world.
- Research-Oriented Curriculum: Taught by leading experts.
- Unravel the Genome: Master DNA sequencing techniques and data analysis.
- Certification: Receive a prestigious certificate upon completion.
- Career Advancement: Open new job opportunities in genetics, biotechnology, and healthcare.

Coursework Overview (Modules)

1. Basics of Bioinformatics & Databases
   LINUX and its application in NGS

2. R Programming and introduction to Bioconductor

OR

3. RNA Sequencing (Reference and DeNovo Based)

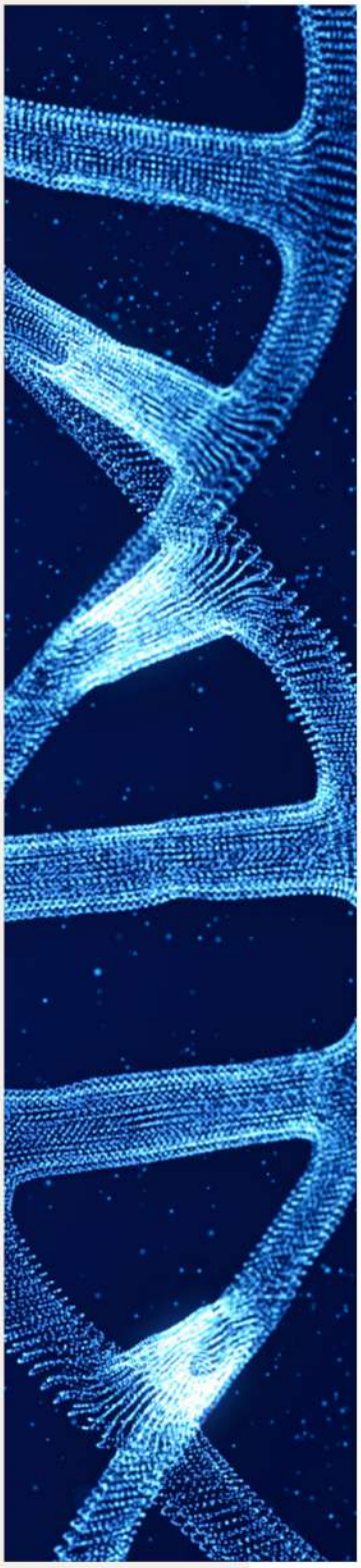
4. DNA Sequencing (Variant calling), Annotation

OR

5. Targeted Metagenomics Data analysis

6. Microarray Illumina GSA

Module 1: Basics of Bioinformatics & Databases LINUX and its application in NGS



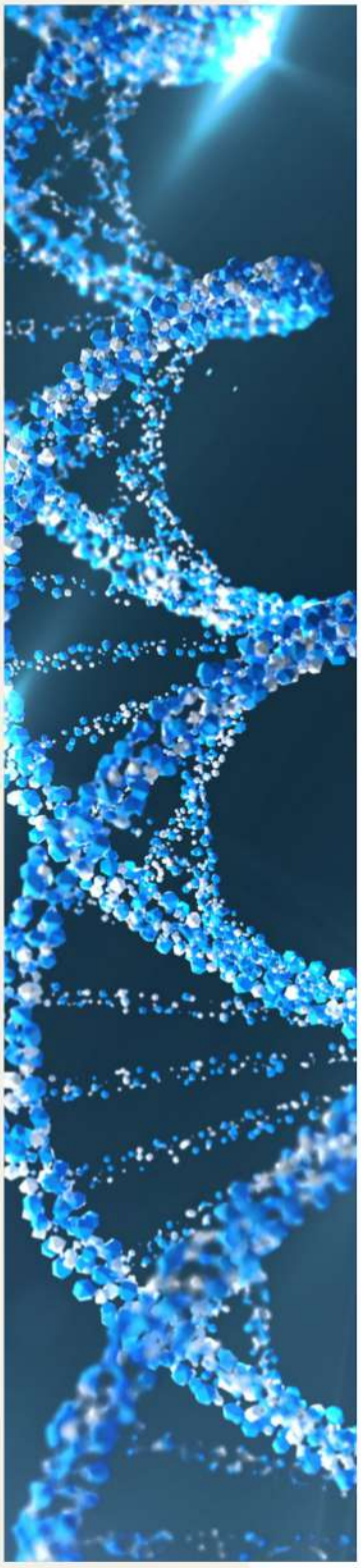
1.1) Basics of Bioinformatics & Databases

- Defining & Understanding Bioinformatics
- Introduction to genomic bioinformatics
- Learning Databases (GenBank, PubMed, KEGG, Clinvar, UCSC, Uniprot, PDB)
- Understanding Bioinformatics Tools (BLAST, Stand-alone BLAST, Mega)
- Introduction to the Linux system
- Bridge the gap between biotechnology and bioinformatics

1.2) LINUX and its application in NGS

- Linux overview and significance
- File and directory operations (create, copy, move, delete)
- Text file editing and creation
- Process management (introduction and termination)
- Basic networking and ownership overview
- Conclusion and further resources
- Basics of Cloud technology (AWS)
- Basics of Pipeline Engineering

Module 2: R Programming and introduction to Bioconductor



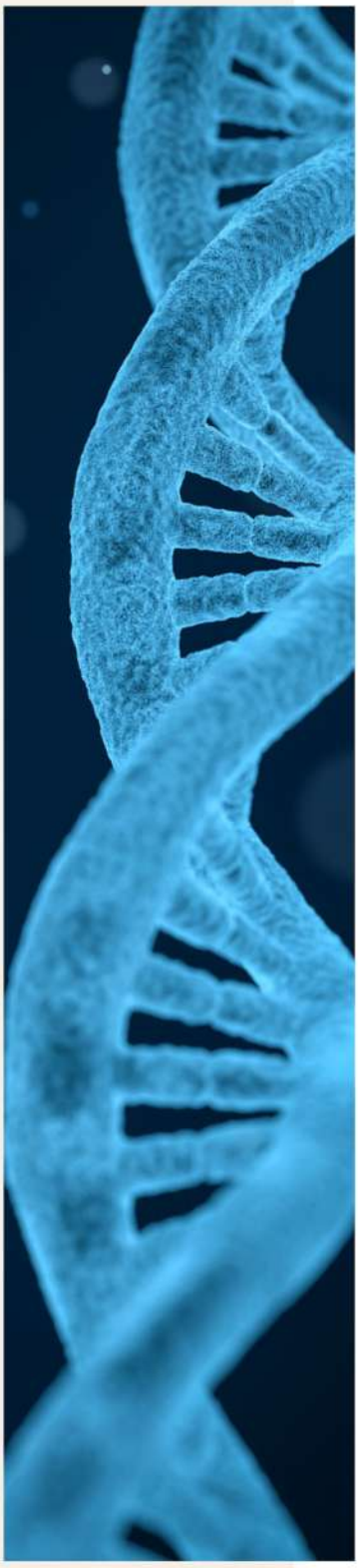
2.1) R Programming

- Introduction to the R language
- Importance of R in Bioinformatics
- Installation of R
- Installation of IDE (R studio)
- Print, cut, and paste functions
- Comments
- Variables
- Data types
- Functions of math
- Operators
- Installation of packages
- String formatting
- Learning Control Statements (if -else, while loop, break, etc.)
- R Data Structures (Lists, Vectors, Arrays, etc)
- File Handling & User-Defined Functions

2.2) Introduction to Bioconductor

- Bioconductor package installation
- Sequence analysis
- Basics of seqinr package
- Import and export FASTA sequences
- Reverse complement
- GC content
- Retrieving genbank and fasta files from NCBI
- Statistical study for Analysis (z-test, t-test, etc)
- Plot generation for data visualization (box plot, PCA plot, Heatmap, Volcano Plot)

Module 3: RNA Sequencing (Reference and DeNovo based)



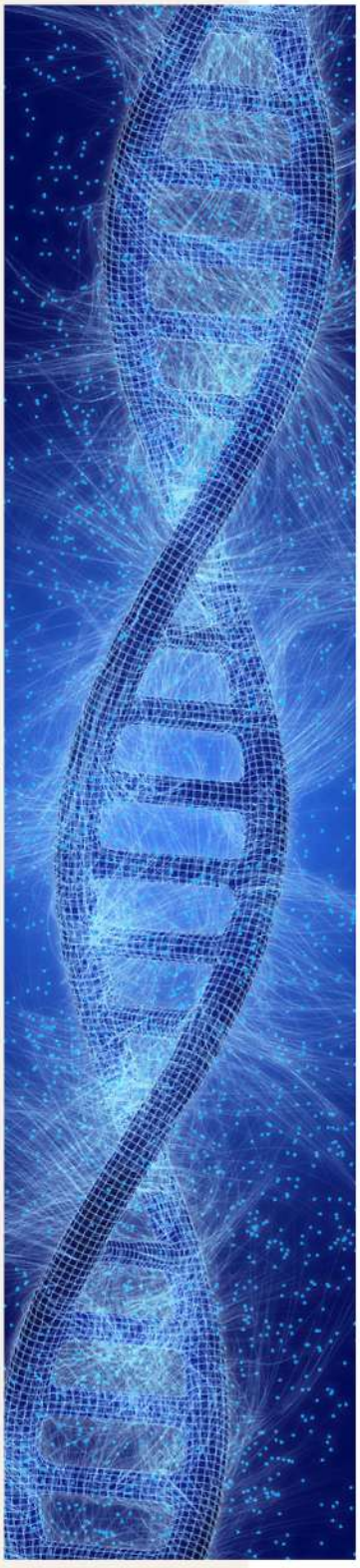
3.1 Reference based

- Introduction to RNA Seq
- Necessary Tools installation
- Learn how Data Retrieval is done
- Quality Check of reads using FASTQC, FastP
- Trimming and cleaning of data using Cutadapt
- Understanding mapping of reads on reference genome and file formats (SAM, BAM) with Hisat2
- Visualization techniques
- Gene Expression Quantification & Analyzation
- Pathway & Gene ontology enrichment analysis using StringTie, DESeq2
- Pathway Network analysis using KEGG

3.2 DeNovo based

- Generation of transcriptomic assembly
- Statistical study of assembly
- Mapping and abundance calculation
- Visualization of mapped reads using Cytoscape
- Generate the count matrices for differential expression analysis

Module 4: DNA Seq (Variant calling), Annotation



- Introduction and installation of tools
- Data retrieval & quality check of reads
- Mapping of reads using reference Genome
- Understanding Mapping Output
- Variant detection
- Visualization of variation
- Annotation and variant effect prediction
- Determining effect of coding non-synonymous mutation on protein function ability

Module 5: Targeted Metagenome analysis

- Data Downloading (NCBI SRA/EBI SRA)
- Quality control using Fastqc
- Trimming (cutadapt/Fastp/Trimmomatic)
- Demultiplexing
- Data Importing
- Quality Check by DADA2
- Phylogenetic Diversity Analysis (Alpha and Beta Diversity)
- Taxonomy Analysis
- Krona Plot
- Phylogenetic Tree Construction using MEGA

Module 6: Microarray Illumina GSA

- Understanding Microarray & its techniques
- Chip designing in Microarray
- Using R for Microarray Data Analysis
- Quality control & Normalization
- Differential Expressional Studies (Up-Regulated & Down-Regulated)
- Gene Ontology Pathway & Enrichment Analysis
- Pathway Network analysis (stringDB(PPI) & Cytoscape)
- Pathway Network Analysis (KEGG Mapper tool for DEG genes)
- Learn Different plots (Heatmap, volcano plot etc) using R

Program Structure

- Duration: 1 Month

NGS Essentials: From Theory to Practice in Just 1 Month

- **NGS Essentials:** Understand the fundamentals of NGS technologies and their applications.
- **Bioinformatics Mastery:** Develop essential bioinformatics skills for genomic data analysis.
- **In-Depth Data Insight:** Explore advanced tools for deciphering complex genetic data.
- **Hands-On Research:** Participate in research projects, applying your knowledge practically.
- **Certification:** Upon successful completion, receive a prestigious NGS Research Course certificate.

Frequently Asked Questions

Q: Are these courses suitable for those new to the field without prior experience?

A: Yes, our courses are designed to cater to beginners with no prior experience in the field. We provide foundational content suitable for all skill levels.

Q: Will I receive a certification upon completing the course?

A: Absolutely, a digital certificate will be awarded upon course completion. You'll receive this certificate via email.

Q: Do the courses include practical projects and research opportunities?

A: Certainly, our courses incorporate practical projects and research opportunities to ensure hands-on learning and the practical application of acquired knowledge.

Q: Can I access class recordings if I miss a class?

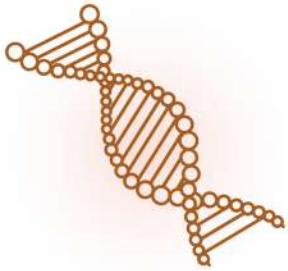
A: Yes, class recordings are available. We'll send you the recording link via email if you miss a class, typically on the day following the live session.

Q: Can I continue to access course materials and resources after finishing the course?

A: Absolutely, you'll retain access to course materials and resources even after completing the course. These materials will be shared with you via email or WhatsApp.

Terms and Conditions

- **Maintaining Discipline during the Tenure.**
- **It is mandatory to maintain 85% attendance for all students.**
- **Students must maintain an average 'A2' grade throughout their training period.**
- **Project completion is a must for research.**
- **Publication Students must participate actively in the Project group**



NEED MORE INSIGHT & SUPPORT?

CONTACT US!

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Thank you!

Dr.Omics Labs
The Doctor of your DNA

OUR CERTIFICATIONS & GRANTS

DIPP21150 #startupindia

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