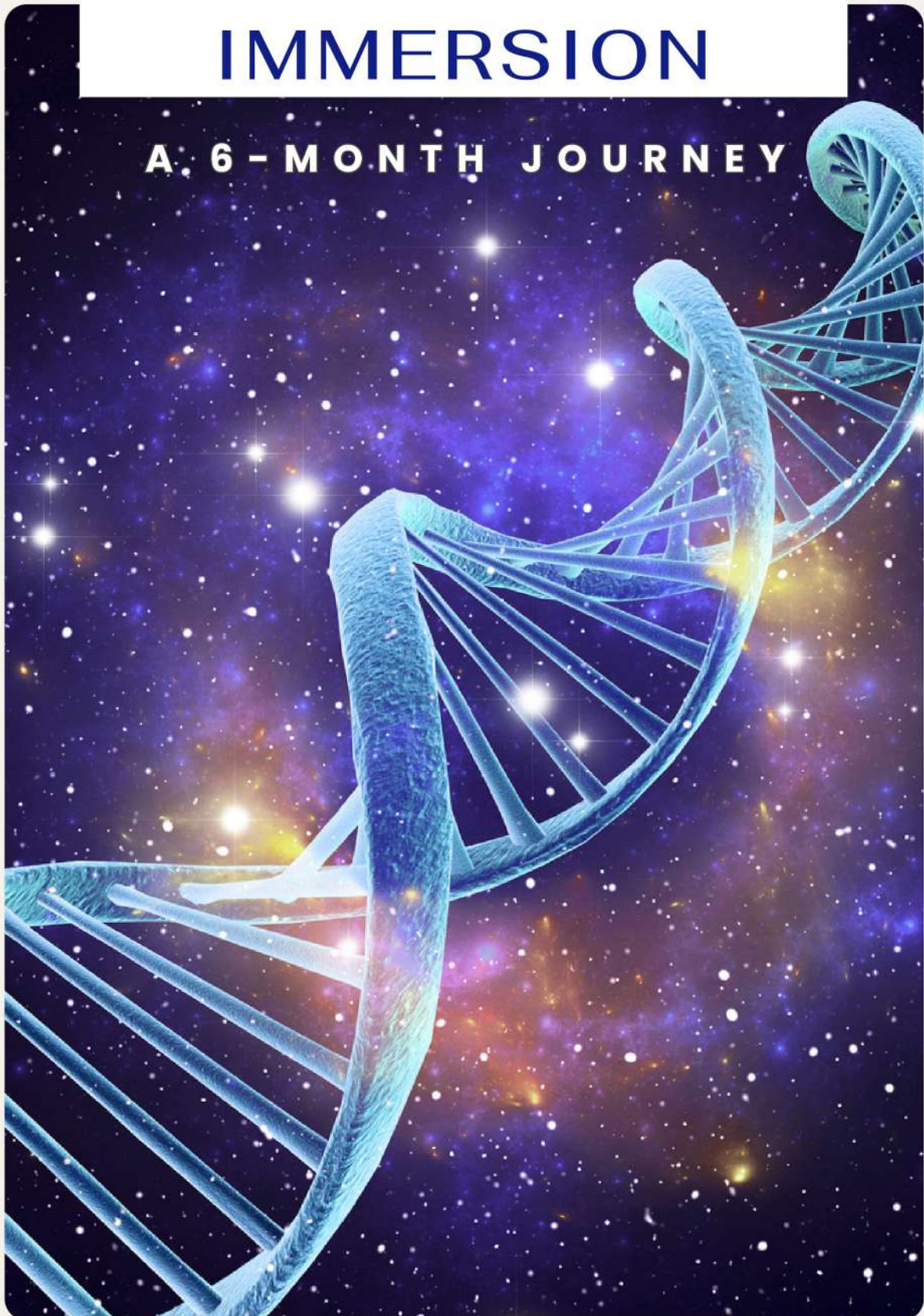




Dr.Omics Labs
The Doctor of your DNA

NGS RESEARCH IMMERSION

A 6-MONTH JOURNEY



- 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 COMPUTATIONAL 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

1. Beginners to Advanced Bioinformatics & NGS
—————
 2. LINUX & Cloud Computing
—————
 3. Python and its Application in NGS Data Analysis Techniques
—————
 4. R and introduction to Bioconductor
—————
 5. RNA Sequencing (Reference and DeNovo Based)
—————
 6. DNA Sequencing (Variant calling), Annotation
—————
 7. Targeted Metagenomics Data analysis
—————
 8. Microarray Illumina GSA
—————
 9. HR Session
—————
 10. Research Project on NGS with Research Paper Publication Guidance
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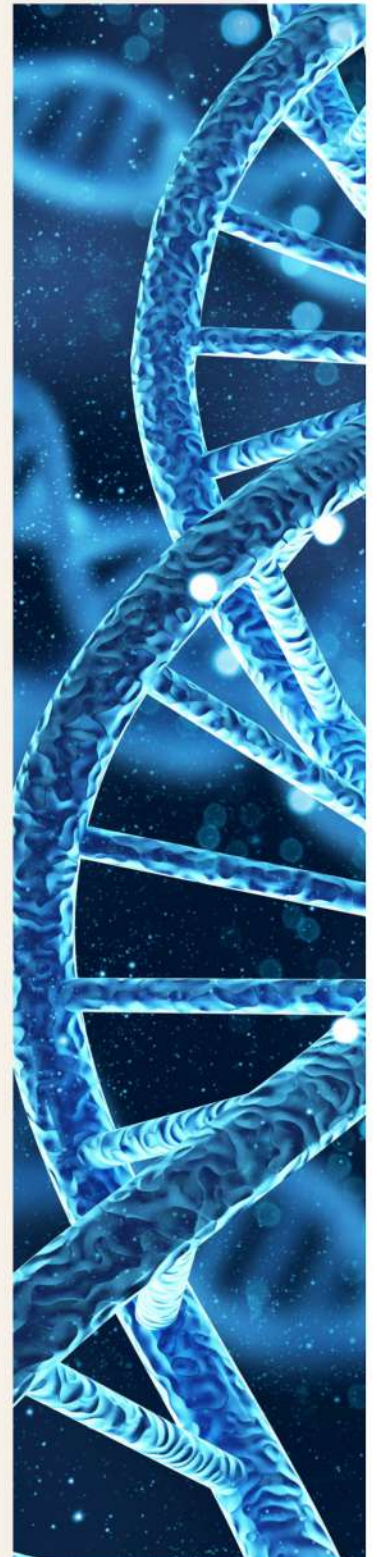
Module 1: Beginners to Advanced Bioinformatics & NGS

1.1) Basics Bioinformatics

- 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) Next Generation Sequencing

- Role of Bioinformatics in NGS
- Introduction to Next-Generation Sequencing
- Introduction to types of NGS techniques
- NGS Applications
- NGS Platforms
- Understanding Data analysis techniques using NGS
- Scope of NGS



Module 2: LINUX & Cloud Computing

- 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 3: Python, Biopython and its Application in NGS Data Analysis Techniques

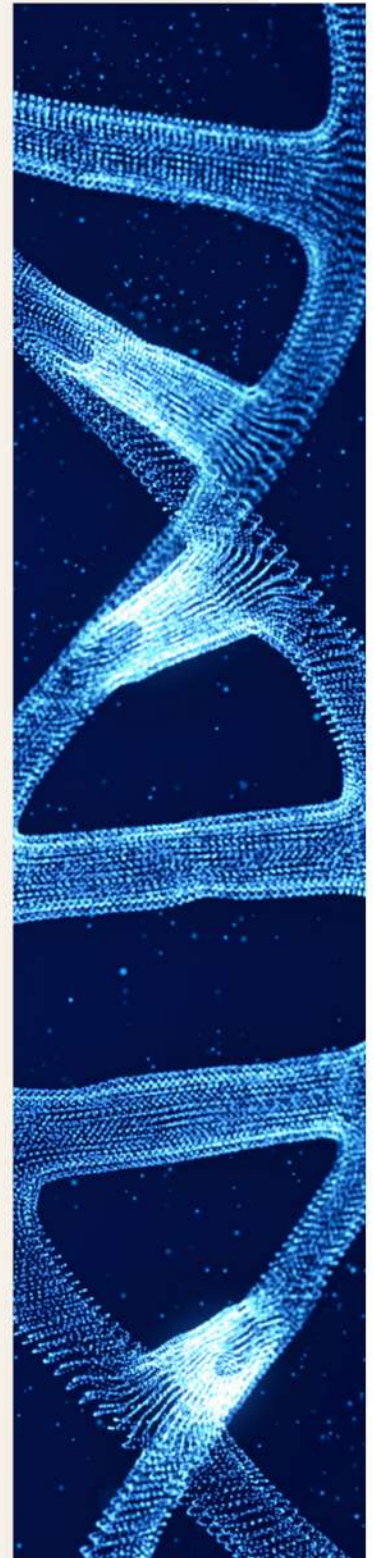
3.1) Python Programming

- Introduction to Python language
- Role of Programming in Bioinformatics
- Installation of Python on various platforms
- Installation of IDE
- Print function
- Comments
- User input
- Command line arguments
- Data types
- Variables and rules to create a variable
- In-built functions of python
- Slicing and indexing in String
- String and data formatting
- Control statements (if -else, If -elif-else, for loop, etc)
- Python data structure (List, Set, Tuple, etc)
- Methods of data structures
- Function introduction & its requirement
- Exception Handling, File Handling & Pandas Library



3.2) Biopython

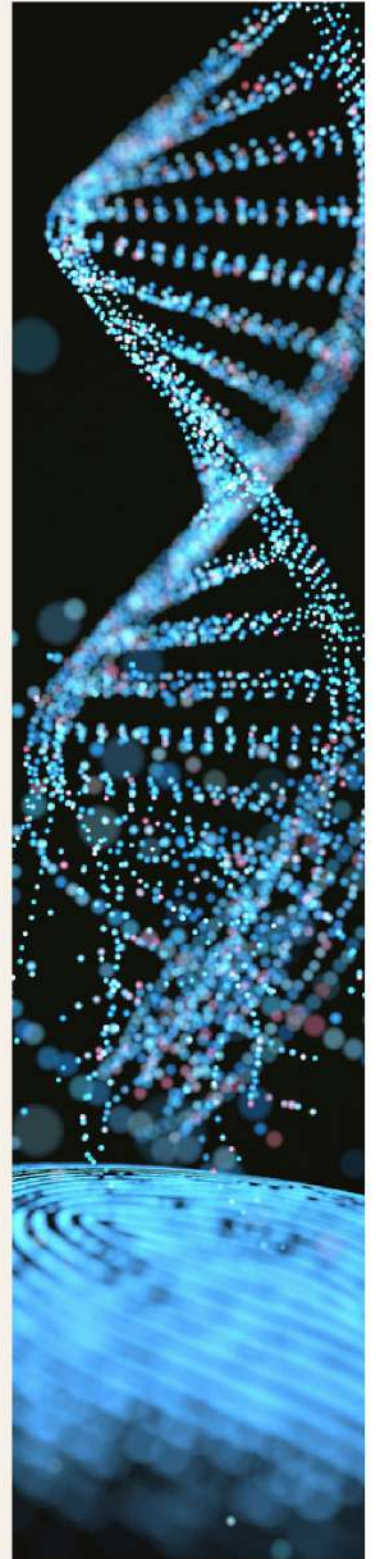
- Introduction to Biopython
- Installation of Biopython
- Conversion of a string into a biological sequence
- Obtaining complement, reverse complement, transcribe, reverse transcribe, and translation from a sequence
- Finding GC content from a sequence
- SeqIO object:
- Reading various biological file formats such as Fasta and GenBank
- Analysis of fasta sequences
- Finding GC content of a fasta file containing multiple sequences and storing the data in a file
- Converting a GenBank file into fasta format
- Accessing NCBI's Entrez databases: Entrez Guidelines (EInfo, ESearch, etc)



Module 4: R and Introduction to Bioconductor

4.1) 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



4.2) 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)



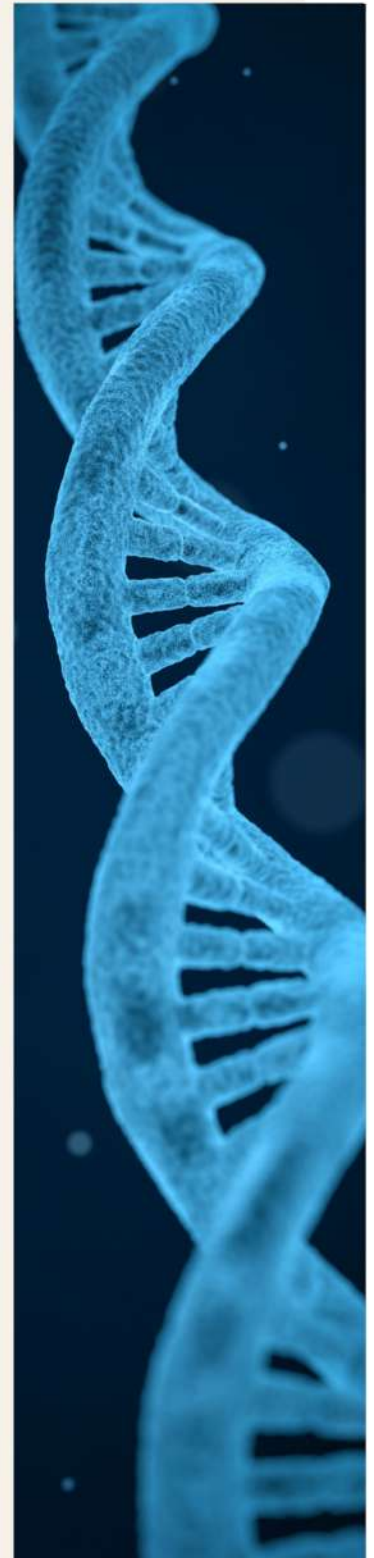
Module 5: RNA Sequencing (Reference and DeNovo based)

5.1 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

5.2 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

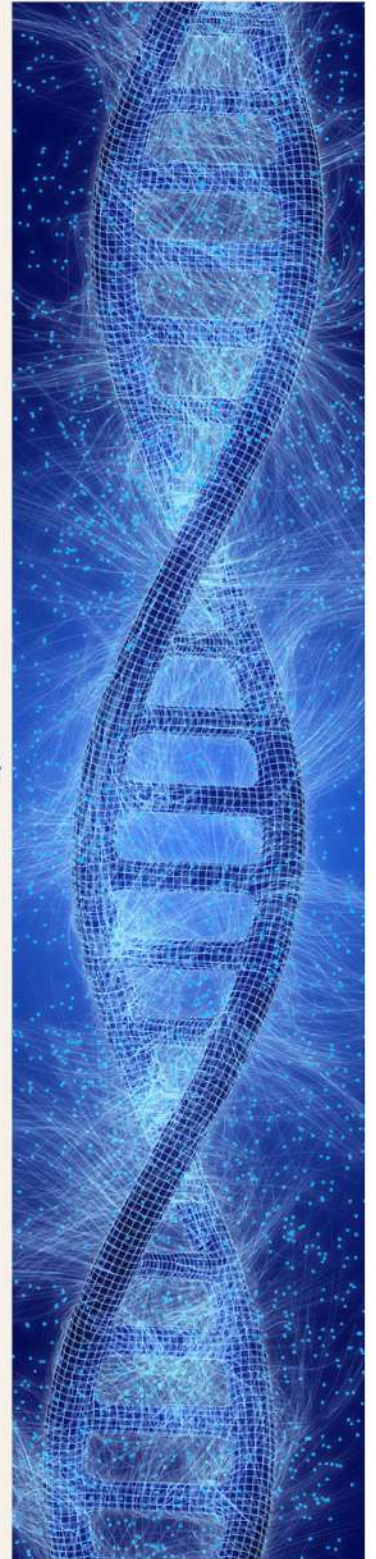


Module 6: DNA Seq (Variant calling), Annotation

- 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 7: 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 8: Microarray Illumina GSA

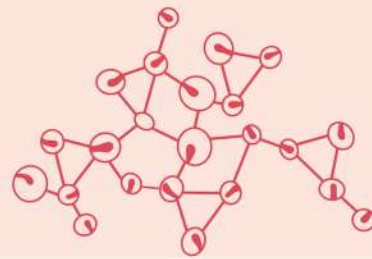
- Understanding Microarray & its techniques
- Chip designing in Microarray
- Using R for Microarray Data Analysis
- Quality control & Normalization
- Differential Expressional Studies (Up-Regulated & Down-Regulated)
- Gene Ontology Pathway & Enrichment Analysis
- Pathway Network analysis (stringDB(PPI)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





Program Structure

- Duration: 6 months



NGS Research Immersion: A 6–Month Journey

- **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.
 - **Ethical Exploration:** Delve into the ethical aspects of genetic research and data handling.
 - **Certification:** Upon successful completion, receive a prestigious NGS Research Course certificate.
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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.

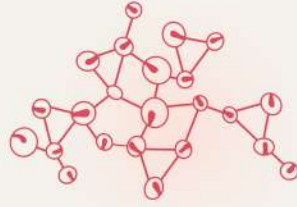
Q: Can I continue to access course materials and resources after finishing the course?

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

