# WHY DROMICS LABS?

**1**

**Strategic Partnership**
with IIT Delhi as the Incubation Hub for Dr. Omics Labs

**2**

**Certifications Achieved** :
- MSME Certification
- Recognized by Startup India
- ISO Certification Attained
- AWS Grant Awarded
- We are Skill India, LSSSDC and NSDC certified

**3**

**Successfully trained**
over 30000 students hailing from diverse corners of the world

**4**

**Becoming professionals' top choice:**
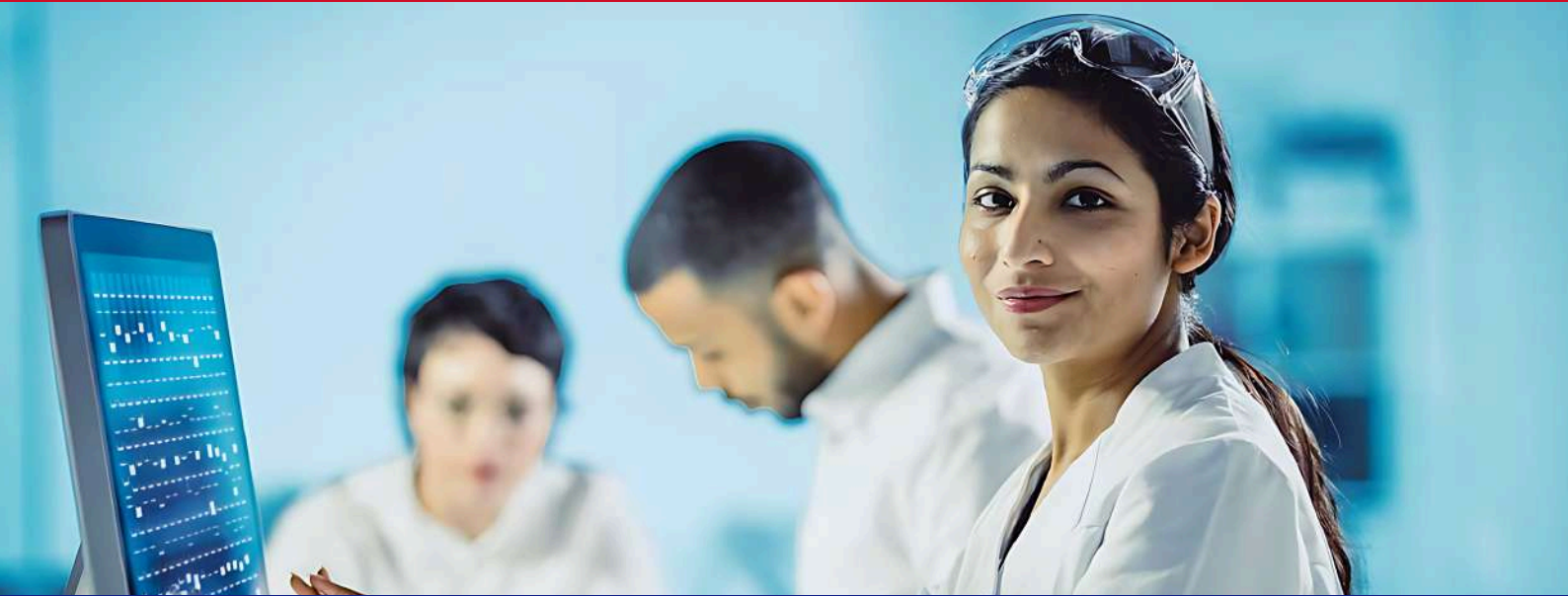More than 15000 LinkedIn Followers.

**5**

Engaging in **collaborative discussions** with multiple universities for student internships.
**Signed MoU with APSCHE (Andhra Govt.)**

**6**

Rapidly expanding business connections in the life sciences industry and global research arenas, fostering robust networks in India and abroad.
**We are providing LSSSDC (Govt. of India) Certification course**

DIPP21150
#startupindia

MSME
सूक्ष्म, लघु एवं मध्यम उद्यम
MICRO, SMALL & MEDIUM ENTERPRISES

ISO 9001 2015 CERTIFIED

aws

Skill India
कौशल भारत - कुशल भारत

LSSSDC

N·S·D·C
National Skill Development Corporation

# Why this Course?

**JOB** — 100 % Placement Assistance

Live Interaction with Industrial Experts

Indian Government Certified Course

Expert Guidance for Research Publications

**30** — Super 30 Bioinformatics Batch

# Key Features Of Our Course:

1. **Practical Approach:** We believe in learning by doing. Our curriculum emphasizes hands-on experience, allowing you to apply theoretical concepts to real-world scenarios, enhancing your problem-solving abilities and practical skills.

2. **Exclusive Interview Opportunities:** As part of our commitment to your success, we provide opportunities for you to interview with well-established companies in the bioinformatics domain. Gain insights into industry practices and secure your dream job.

3. **Third-Party Examination:** To validate your expertise, we offer a third-party examination option. For a nominal fee of INR1650/-, you can opt for this examination to further enhance your credentials and stand out in the competitive job market.

4. **Government of India Recognized Certificate:** Upon successful completion of the course, you will receive a prestigious certificate recognized by the Government of India, affirming your proficiency in bioinformatics analysis.

5. **Guidance for Research Publication:** We understand the importance of contributing to the field of bioinformatics. Our expert faculty members provide guidance and support for your research endeavors, facilitating publication in reputable journals and conferences.

6. **100 % Placement Assistance:** Enroll in our course and take advantage of our 100% placement support, which includes personalized career counseling, resume building, interview preparation, and direct connections with top industry employers to ensure you secure the perfect job to kickstart your career.

# MODULE : 1
## NAVIGATING THE BIOINFORMATICS PROFESSION: AN ORIENTATION

- Introduction to Bioinformatics and its Applications in Life Sciences

- Career Pathways and Opportunities in Bioinformatics

- The Interdisciplinary Nature of Bioinformatics: Bridging Biology and Computer Science

- Organizational Structure and Employment Benefits in the Life Sciences Industry

- Regulatory Framework and Compliance in Bioinformatics

- The Role of Bioinformatics Scientists in Advancing Life Sciences Research

- Essential Skills and Competencies for Bioinformatics Professionals

- Ethical Considerations and Responsibilities in Bioinformatics Practice

- Bioinformatics Tools and Technologies: A Landscape Overview

- Emerging Trends and Future Directions in Bioinformatics Research and Industry
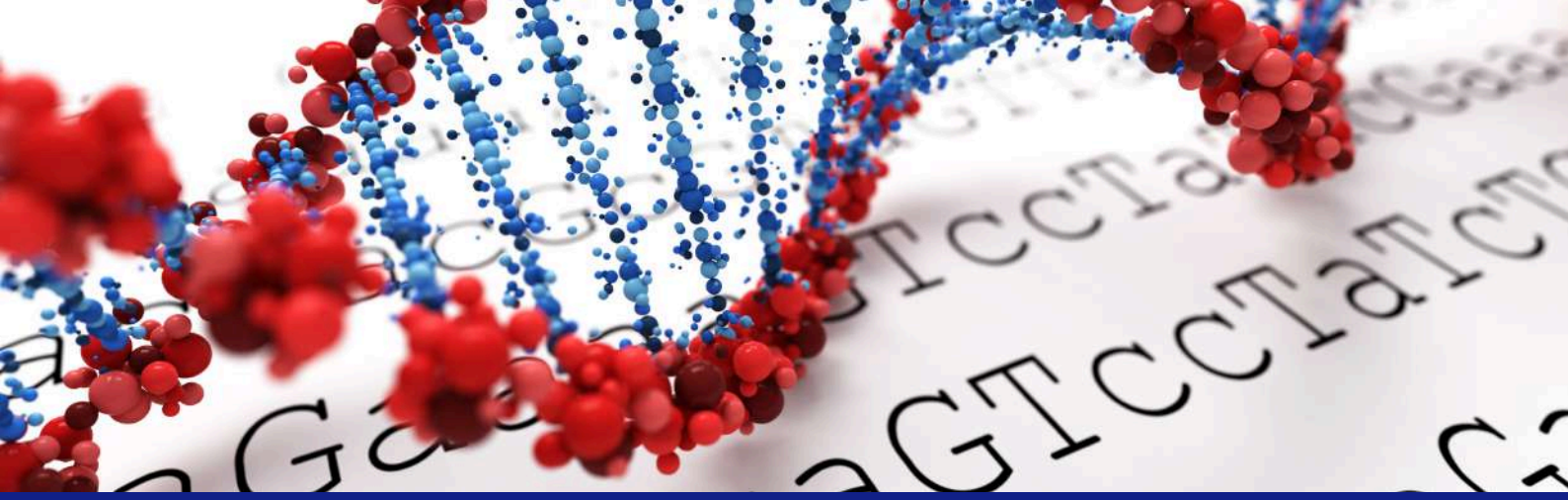
# MODULE : 2
## INTRODUCTION TO BIOINFORMATICS

- Importance of bioinformatics in modern biology

- Detailed explanation for central dogma of cell : Replication,Transcription,Translation, study about DNA,RNA,Protein ,Strand

- Detailed study about structure of gene, transcript,upstream,downstream regions,CDS,UTR

- Detailed study about protein primary/secondary and tertiary structure

- Detailed study about enzymes,Bonds and Interactions

- Basics of nucleotide and protein sequence, and FASTA format,fastq,SAM/BAM

- Pairwise sequence alignment techniques (local, global)and Introduction to multiple sequence alignment

- Introduction to genomics and Proteomics in Bioinformatics

- What is NGS ? Genome assembly and sequencing techniques (e.g., Sanger sequencing, Next-Generation Sequencing)

- Different applications of NGS( ex. DNAseq, RNAseq, CHIPseq, metagenomics, Methlyseq etc.)

# MODULE : 3
## INTRODUCTION TO BIOINFORMATICS DATABASES

- Understanding Data Sources in Bioinformatics: Open Source vs. Paid

- Utilizing Tools for Data Import from Public and Private Databases

- Overview of Bioinformatics Databases: Types and Categories

- Introduction to Types of Databases: primary/secondary/data structure/types of data etc..

- Navigating Genomic Databases: GenBank Database

- Protein Databases: Structure, Function, and Interaction Databases : PDB ,UniProt Database

- Data Retrieval Techniques: Querying Databases Using Keywords, IDs: UCSC Database

- Literature Database: PubMed Database

- ClinVar Database

- Integrated Databases: Resources Combining Multiple Data Types (e.g., KEGG, Reactome)

- Ensemble Database

# MODULE : 4
## BIOINFORMATICS TOOLS

- Introduction to Sequence Alignment

- Types of Alignment(Pairwise & Multiple)

- Local & Global Alignment

- Online Blast

- Standalone BLAST

- MEGA

- ClustalW

- Visualization tools Pymol / Jmol(optional)
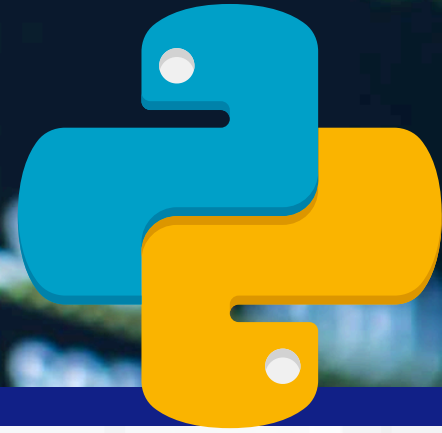
# MODULE : 5
## INTRODUCTION TO LINUX

- Overview of Linux

- Package Management

- Basic Commands for file handling

- Advanced Linux commands

- Introduction to Bash Scripting

# MODULE : 6
## DATA ANALYSIS WITH R PROGRAMMING

- Getting Ready with R introduction and installtion

- Data Types, Variables, and Basic R Operations

- Function–buit–in and User defined

- Conditional statments

- Data Wrangling and Cleaning :Importing data into R(e.g., FASTA, GenBank)

- Package installation from CRAN repository and Bioconductor

- Data manipulation with dplyr for biological datasets

- Working with Strings:Sequence Analysis with seqinr and biostring

- Statistical Test–t–test ,z–test ,chiSquare and ANOVA

- Data Visualization

# MODULE : 7
## INTRODUCTION TO PYTHON LANGUAGE

- Introduction to Python language

- Data types and data structure

- Control statements: if –else, If–elif–else, for loop, while loop

- Python data structure : List, Set, Tuple, Dictionary

- Methods of List, Slicing and indexing in List and Tuple

- Functions : Function introduction and its requirement, Defining a function, Calling a function

- File handling :file handling, OS module

- Pandas library: Reading different file formats such as csv, tsv and excel files

- Biopython

- SeqIO and visualization
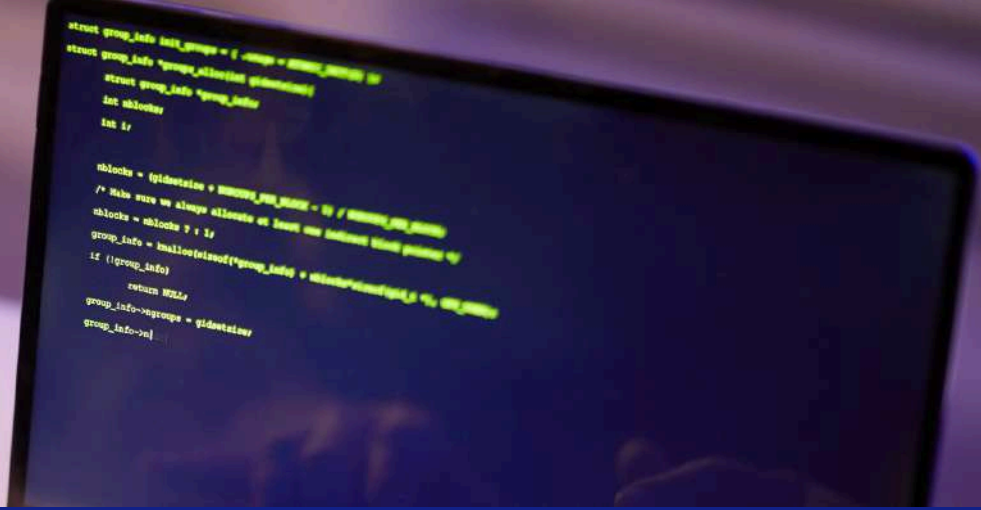
# MODULE : 8
## DATA STRUCTURES AND ALGORITHM

- Introduction to Data Structures and Algorithms in Bioinformatics

- Fundamentals of Data Structures: Arrays, Linked Lists, Stacks, and Queues

- Trees and Graphs: Essential Data Structures in Bioinformatics

- Advanced Data Structures: Dynamic Arrays, Priority Queues, and Hash Tables

- Manipulating Data Structures: Adding, Removing, and Editing Data

- Algorithmic Complexity Analysis in Bioinformatics

- Sorting and Searching Algorithms for Bioinformatics Applications

- Indexing Techniques for Efficient Data Retrieval in Bioinformatics

- Greedy Algorithms and their Applications in Bioinformatics

- Divide and Conquer Techniques for Problem Solving in Bioinformatics

- Dynamic Programming in Bioinformatics: Concepts and Examples

- Bioinformatics Algorithms for Sequence Analysis and Alignment

- Computational Methods for Graph Analysis in Bioinformatics

- Machine Learning Algorithms for Bioinformatics Data Analysis

- Practical Applications: Implementing Data Structures and Algorithms in Bioinformatics Software
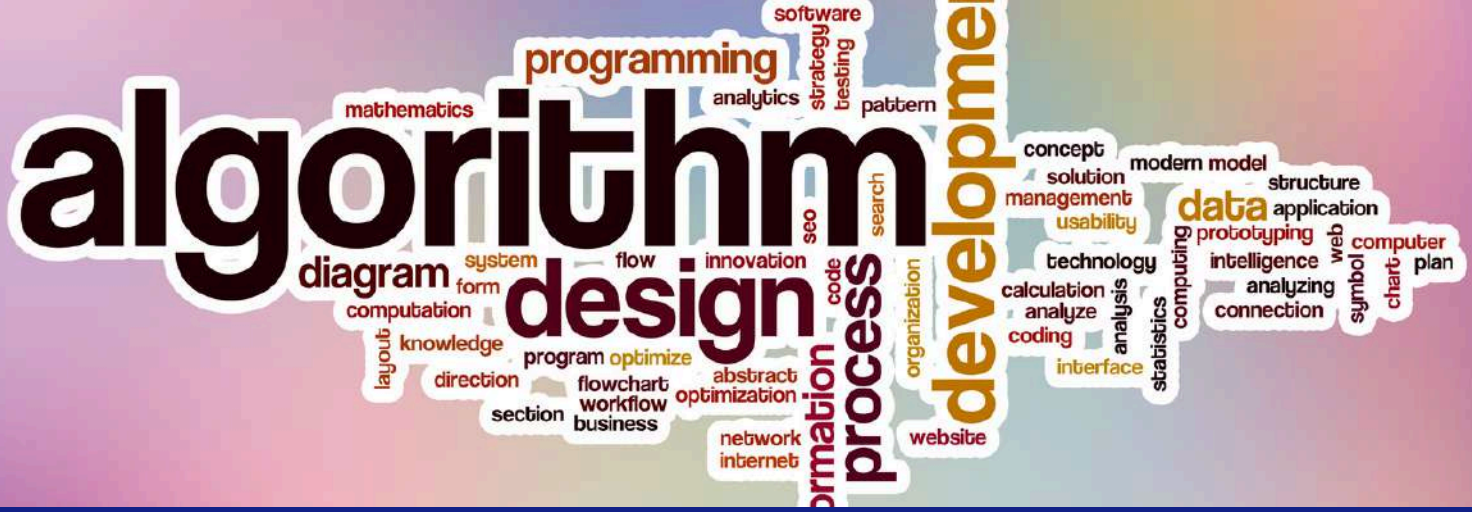
# MODULE : 9
## GRAPH ALGORITHM

- Introduction to Graph Algorithms in Bioinformatics

- Basics of Undirected Graphs: Representation and Exploration

- Understanding Directed Graphs: Acyclic Graphs and Topological Sorting

- Decomposing Graphs: Algorithms for Partitioning Graphs into Parts

- Finding Shortest Paths in Graphs: BFS, Shortest-Path-Tree, Dijkstra's, and Bellman-Ford Algorithms

- Minimum Spanning Trees: Greedy Algorithms such as Kruskal's and Prim's

- Fundamentals of Graph Theory in Bioinformatics

- Representing Biological Data as Graphs: Applications and Techniques

- Graph Traversal Algorithms: BFS and DFS for Bioinformatics Applications

- Graph Clustering and Community Detection Algorithms in Bioinformatics

# MODULE : 10
## STRING ALGORITHM

- Introduction to String Algorithms in Bioinformatics

- Brute Force Approach for Pattern Matching: Concepts and Applications

- Suffix Trees: Concepts and Algorithms for Pattern Matching

- Approximate Pattern Matching: Suffix Arrays and Burrows-Wheeler Transform

- Exact Pattern Matching: Knuth-Morris-Pratt Algorithm

- Techniques for Constructing Suffix Trees and Arrays

- Sequence Alignment Algorithms: Needleman-Wunsch and Smith-Waterman

- Sequence Similarity and Homology Search Methods: BLAST and HMMER

- String Manipulation Techniques in Bioinformatics: Applications and Tools

- Practical Applications: Implementing String Algorithms in Bioinformatics Software

# MODULE : 11
## NEUTRAL NETWORKS

- Understanding Artificial Neural Networks: Types and Applications

- Building Shallow and Deep Neural Networks: Forward and Back Propagation Techniques

- Convolutional Neural Networks (CNNs): Foundations and Applications in Image Classification

- Object Detection with Convolutional Neural Networks: Techniques and Implementation

- Recurrent Neural Networks (RNNs): Types and Variants including GRUs and LSTMs

- Word Vector Representations and Embedding Layers in RNNs: Training Techniques

- Introduction to Attention Models and Their Applications in Speech Recognition

- Deep Learning Architectures for Bioinformatics: CNNs and RNNs

- Applications of Neural Networks in Sequence Analysis and Prediction

- Training and Evaluation of Neural Networks for Biological Data: Methods and Challenges

# MODULE : 12
## CHEMINFORMATICS IN BIOINFORMATICS

- Drug Discovery and Development Process: Understanding QSAR Principles

- Introduction to Drug Discovery Process–drug discovery pipeline

- Role of Computational Methods– The significance of computational tools in drug design – Examples of computational methods in drug discovery

- Utilizing Biological Databases and Good Clinical Practices (GCP) Standards

- Chemical Structure Visualization–ChemDraw / ChemSketch, Basics of chemical structure visualization

- Visual Representation of Biological Processes and Structures in Data Analysis

- Biomolecules– Properties and function

- Molecular Docking and Molecular Dynamics: Outcomes in Visualization and Evaluation

- Pharmacophore Modeling and Applications

- Pharmacophore Modelling

# MODULE : 13
## VARIANT CALLING ANALYSIS

- Introduction to NGS and DNAseq

- Basic Terminologies in NGS

- Understanding of SRA database

- Tools installation in Linux for Variation Calling

- Quality control (FastQC)

- Trimming of Reads (Trimmomatic)

- Indexing of Genome (BWA) and Alignment of Reads (BWA)

- Variation calling using GATK

- Variant Effect Prediction(VEP)

- Variation Visualization (IGV)

# MODULE : 14

## GENE EXPRESSION ANALYSIS USING REFERENCE BASED RNASEQ PIPELINE

- Introduction to NGS and its's applications

- Introduction to RNAseq and it's basic terminologies

- Basic Terminologies in NGS

- Understanding of SRA database

- Tools installation in Linux for Gene Expression analysis

- Quality control (FastQC)

- Trimming of Reads (Trimmomatic)

- Indexing of Genome (STAR) and Alignment of Reads (STAR)

- Normalization of Data (Cufflinks)

- Merging of Data (Cuffmerge) and Differential expression of genes (Cuffdiff)
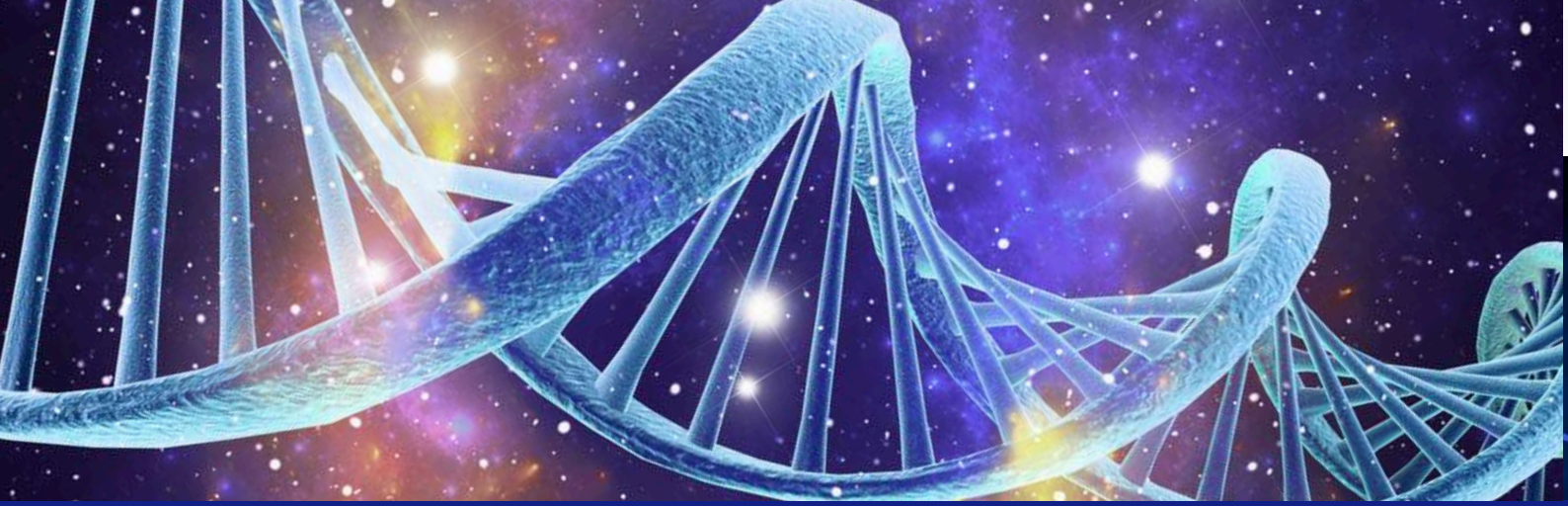
- Understanding of DEG results

- Annotation of DEG (Uniprot/DAVID)

- Functional and Pathway Enrichment Analysis

- Network Analysis

- Visualization of Differential expressed genes in R (Heatmap & Volcano Plot)
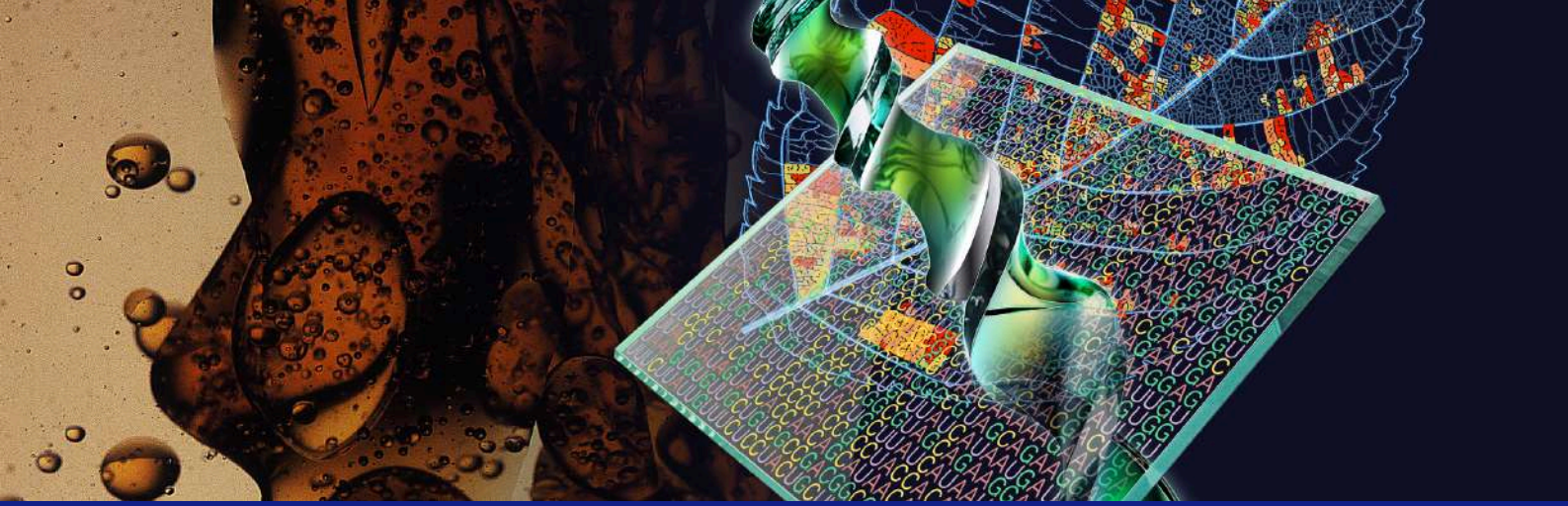
# MODULE : 15
## INTRODUCTION TO METAGENOMICS

- Overview of Metagenomics: Concepts and Applications

- Historical Perspective and Evolution of Metagenomics

- Sampling and Sample Preparation Techniques in Metagenomics

- DNA Extraction and Sequencing Technologies for Metagenomics

- Metagenomic Data Analysis Pipeline: From Raw Reads to Biological Insights

- Taxonomic Profiling in Metagenomics: Identifying Microbial Communities

- Functional Annotation and Pathway Analysis in Metagenomics

- Applications of Metagenomics in Biomedical and Environmental Research

- Challenges and Limitations in Metagenomic Data Analysis

- Future Directions and Emerging Trends in Metagenomics

# MODULE : 16
## AWS

- Introduction to Cloud Computing for Bioinformatics: Concepts and Advantages

- Overview of Amazon Web Services (AWS) for Bioinformatics Data Analysis

- Setting up an AWS Account and Access Management for Bioinformatics Workflows

- Deployment Strategies for Bioinformatics Workflows on AWS: EC2, Lambda

- Utilizing AWS Services for Data Storage: S3, EBS, and Glacier

- Leveraging AWS Compute Services for Bioinformatics Analysis

- Implementing Data Analysis Pipelines on AWS: Using Step Functions and Data Pipeline

- Cost Optimization Techniques for Bioinformatics Workloads on AWS

- Security Best Practices for Bioinformatics Data in AWS: IAM Policies and Encryption

- Monitoring and Management Tools for Bioinformatics Workflows on AWS

# MODULE : 17
## MACHINE LEARNING/ARTIFICIAL INTELLIGENCE

- Introduction to Machine Learning and Artificial Intelligence in Bioinformatics

- Supervised Learning Algorithms for Bioinformatic Data Analysis

- Unsupervised Learning Algorithms for Bioinformatic Data Analysis

- Semi-Supervised Learning Techniques in Bioinformatics

- Feature Selection Methods for Biological Data in Machine Learning

- Feature Extraction Techniques for Bioinformatics Analysis

- Model Evaluation and Validation Techniques in Machine Learning

- Applications of Machine Learning and AI in Bioinformatics: Classification
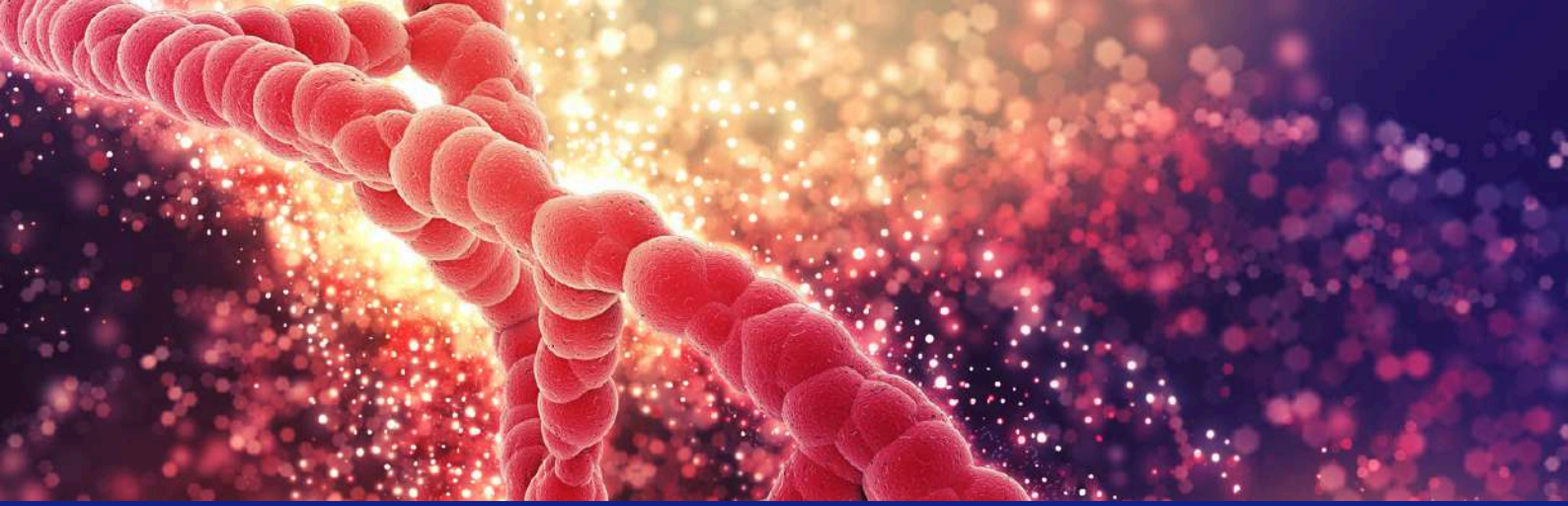
## MODULE : 18
### RESEARCH PUBLICATION

## MODULE : 19
### MANAGE YOUR WORK TO MEET REQUIREMENTS

## MODULE : 20
### WORK EFFECTIVELY WITH COLLEGUES

## MODULE : 21
### BUILD AND MAINTAIN RELATIONSHIP AT WORKPLACE

## MODULE : 22
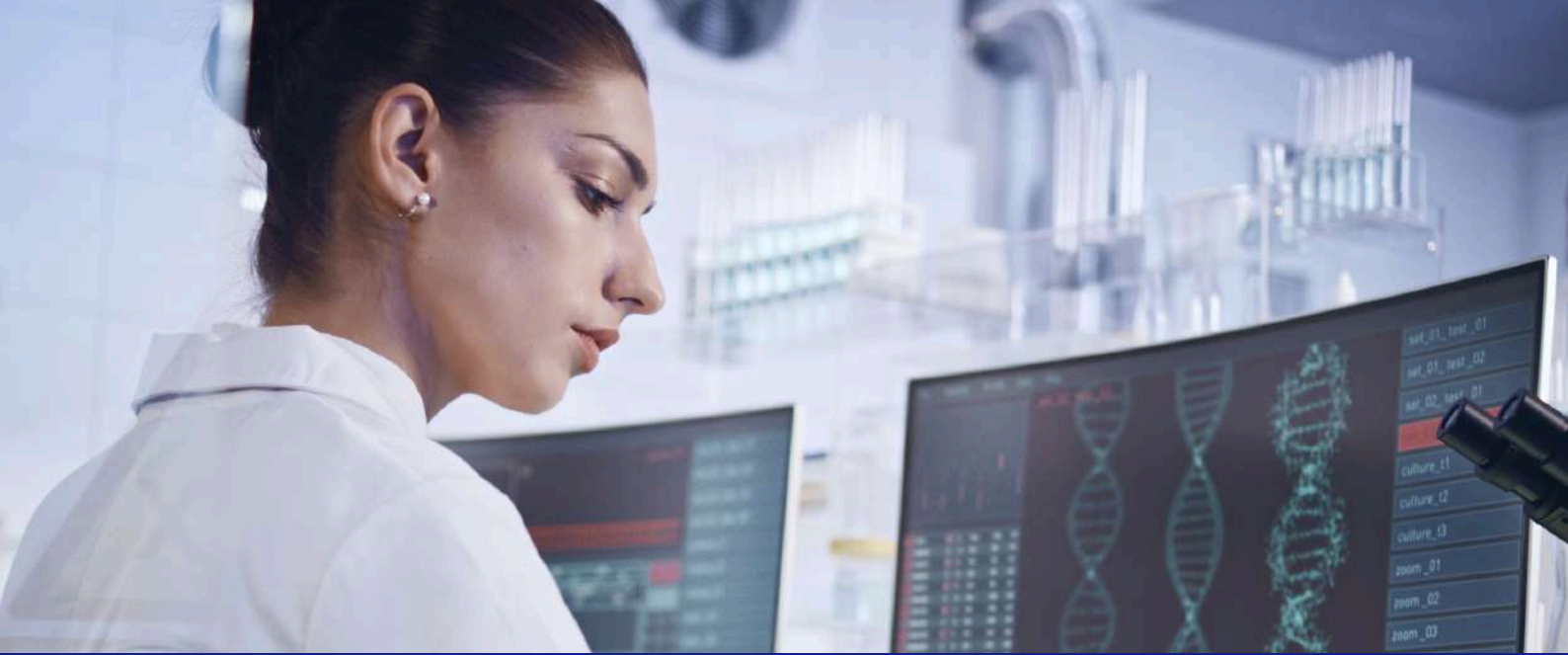### BUILD AND MAINTAIN CLIENT SATISFACTION

# MODULE : 23
## EMPLOYABILITY SKILL

# MODULE : 24
## PERSUASIVE COMMUNICATION

# MODULE : 25
## IDENTIFYING MODEL RISK

# MODULE : 26
## MEASURING MODEL PERFORMANCE

# Join Us in Shaping the Future of Bioinformatics!

Embark on a journey of discovery and innovation with our LSSSDC certified Bioinformatics Analyst course. Whether you're a seasoned professional or a recent graduate, our program caters to individuals at all stages of their career. Take the first step towards a rewarding career in bioinformatics and unlock a world of opportunities.

## Why Choose Our Course?

1. **Accredited Certification:** Our program is certified by the Life Sciences Sector Skill Development Council (LSSSDC), ensuring that your credentials are recognized and respected by industry professionals worldwide.

2. **Expert Faculty:** Learn from seasoned experts in bioinformatics analysis who bring real-world experience and cutting-edge insights to the classroom.

3. **Hands-On Learning:** Gain practical skills through interactive workshops, case studies, and projects that simulate real-life scenarios, allowing you to apply theoretical knowledge to practical applications.

4. **Comprehensive Curriculum:** Covering key topics such as sequence analysis, genomics, proteomics, and more, our curriculum is meticulously crafted to provide you with a well-rounded understanding of bioinformatics principles and techniques.

5. **Career Support:** Receive personalized career guidance and support from our dedicated team, including resume building, interview preparation, and job placement assistance, to help you kickstart your career in bioinformatics.

6. **Networking Opportunities:** Connect with fellow aspiring bioinformatics analysts, industry professionals, and mentors to expand your professional network and stay updated on the latest trends and developments in the field.

# Dr.Omics Labs
### The Doctor of your DNA



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*Thank you!*

## OUR CERTIFICATIONS & GRANTS

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