



Dr. Omics Labs
The Doctor of your DNA



**LSSSDC (GOVT. OF INDIA)
CERTIFIED 840 HRS COURSE**

BIOINFORMATICS SCIENTIST

Empowering Your Career through Practical
Training and Industry Recognition

www.dromicslabs.com





Why DrOmics Labs

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Strategic Partnership

- MoU with Andhra Pradesh **Government** for internship

Certifications Achieved :

- MSME Certification
- Recognized by Startup India
- ISO Certification Attained
- **AWS** Grant Awarded
- **Skill India** Certified

Successfully trained over 5000 students hailing from diverse corners of the world

Becoming professionals' top choice: 10000 LinkedIn followers in a short time.

Engaging in collaborative discussions with multiple universities for student internships

Rapidly expanding business connections in the Life sciences industry and global research arenas, fostering robust networks in India and abroad



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Key Features of Our Course:

- 1. 840 Hours of Comprehensive Learning:** Our intensive course spans over 840 hours, equivalent to 28 Indian Education System Credits, ensuring you receive in-depth training and expertise in bioinformatics.
- 2. 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.
- 3. 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.
- 4. 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.
- 5. 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.
- 6. 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.



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MODULE : 1

NAVIGATING THE BIOINFORMATICS PROFESSION: AN ORIENTATION

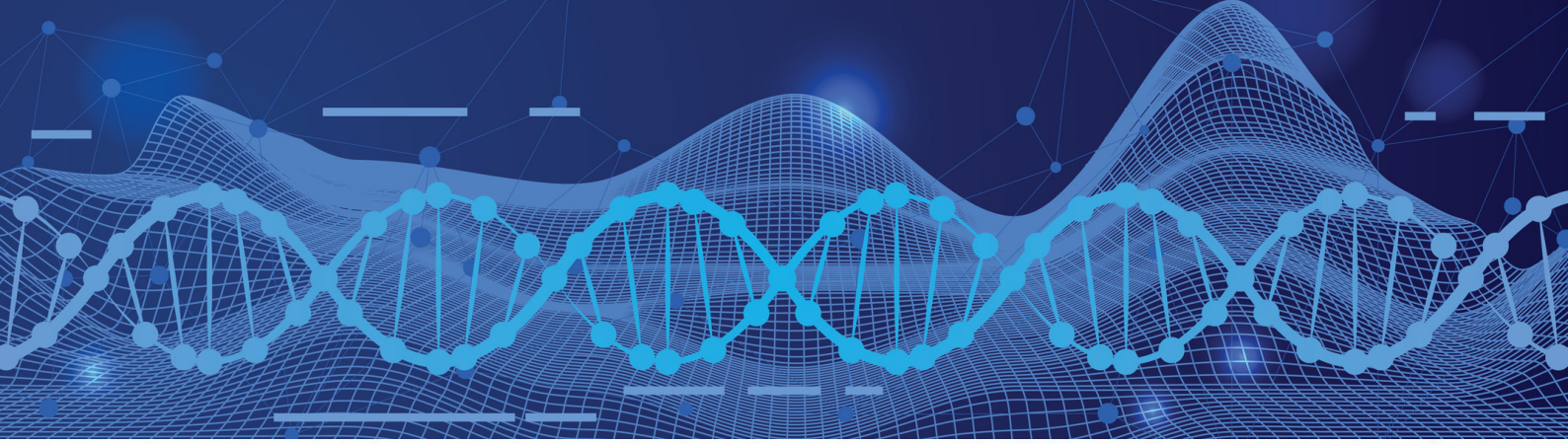
- Introduction to Bioinformatics and its Applications in Life Sciences
 - Career Pathways and Opportunities in Bioinformatics
 - The Interdisciplinary Nature of Bioinformatics: Bridging Biology and Computer Science
 - Organizational Structure and Employment Benefits in the Life Sciences Industry
 - Regulatory 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
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MODULE : 2

INTRODUCTION TO BIOINFORMATICS

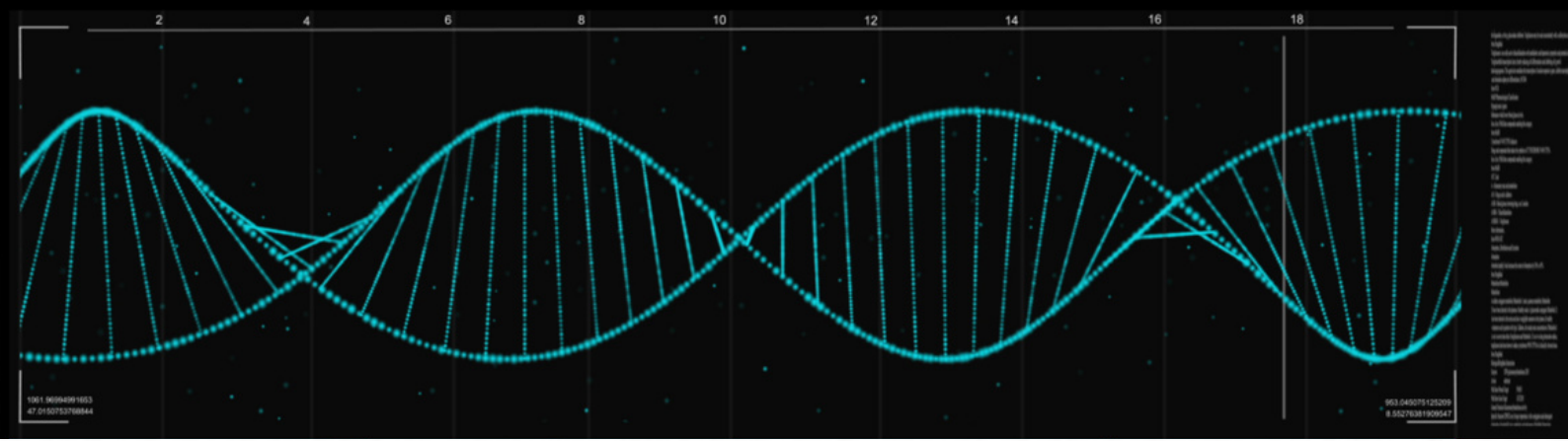
- Importance of bioinformatics in modern biology
 - Detailed explanation for central dogma of cell : Replication,Transcription,Translation, study about DNA,RNA,Protein ,Strand
 - Detailed study about structure of gene, transcript,upstream,downstream regions,CDS,UTR
 - Detailed study about protein primary/secondary 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

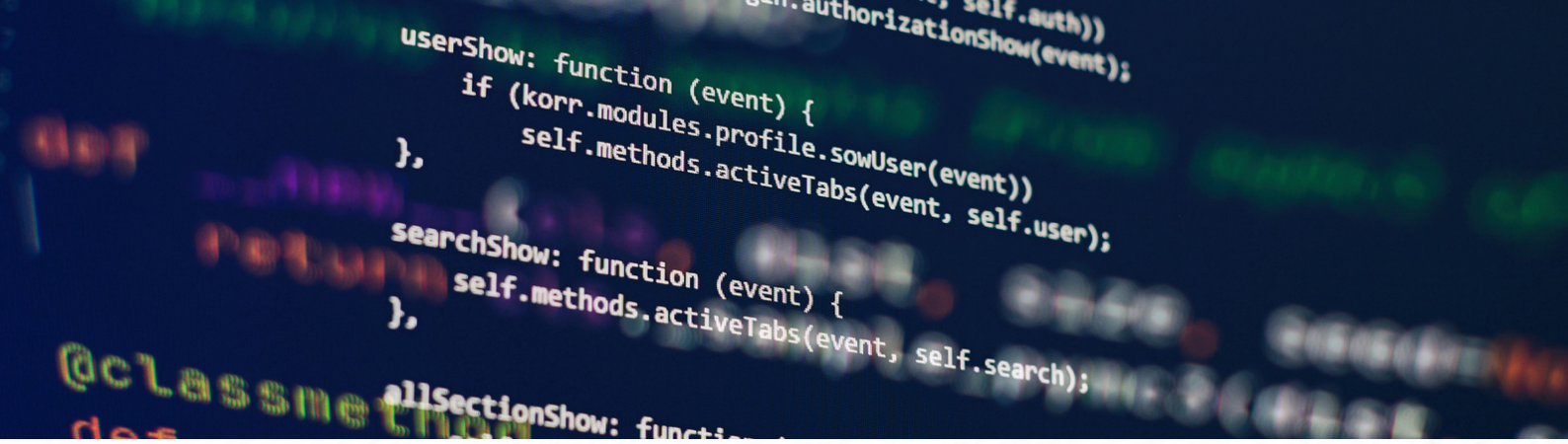
- Understanding Data Sources in Bioinformatics: Open Source vs. Paid
 - Utilizing Tools for Data Import from Public and Private Databases
 - Overview of Bioinformatics Databases: Types and Categories
 - Introduction to Types of Databases: primary/secondary/data structure/types of data etc..
 - Navigating 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 installation
 - Data Types, Variables, and Basic R Operations
 - Function-built-in and User defined
 - Conditional statements
 - 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
-

```
23     return NULL;
```

```
24     group_info->ngroups = gidsetsize;
```

```
25     group_info->nblocks = nblocks;
```

```
26     atomic_set(&group_info->usage, 1);
```

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
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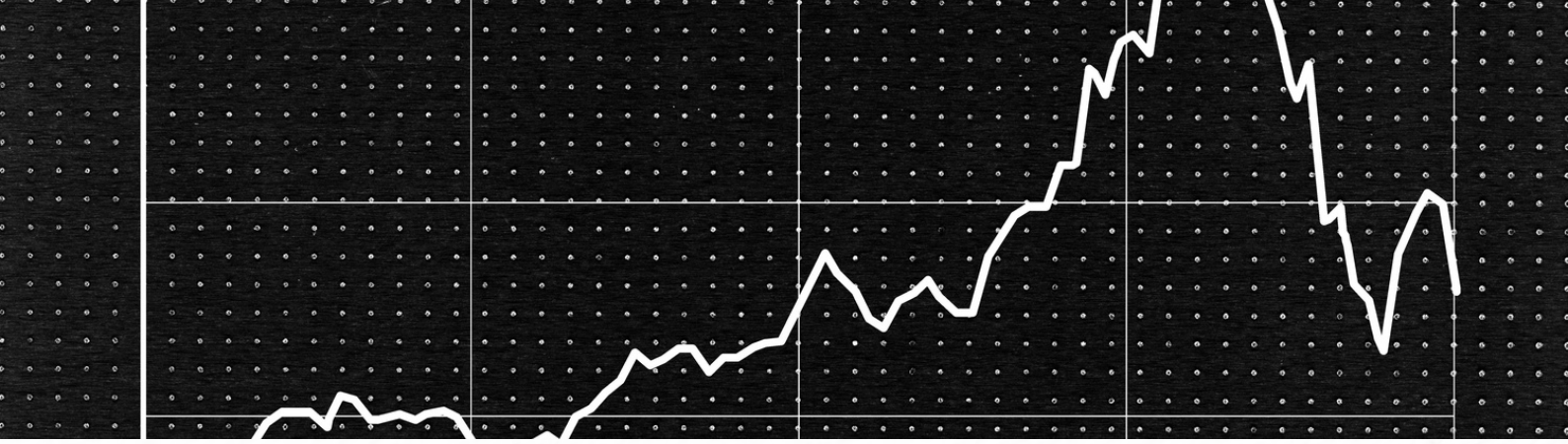
MODULE : 8

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
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MODULE : 11

NEURAL 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
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MODULE : 13

VARIANT CALLING ANALYSIS

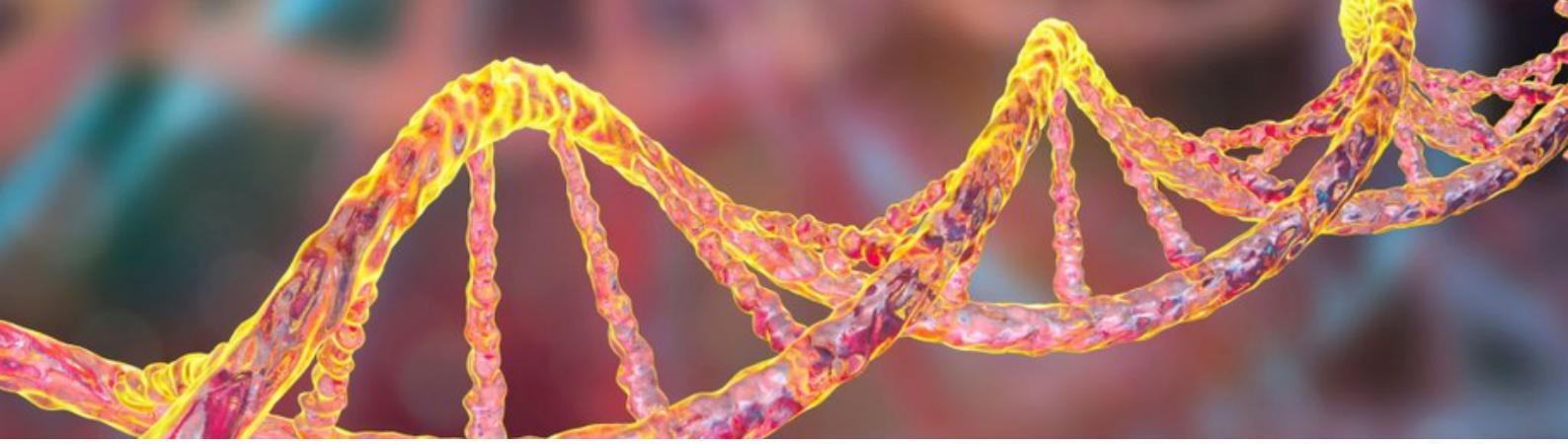
- Introduction to NGS and DNaseq
 - Basic Terminologies in NGS
 - Understanding of SRA database
 - Tools installation in Linux for Variation Calling
 - Quality control (FastQC)
 - Trimming of Reads (Trimmomatic)
 - Indexing of Genome (BWA) and Alignment of Reads (BWA)
 - Variation calling using GATK
 - 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)
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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
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MODULE : 16

AWS

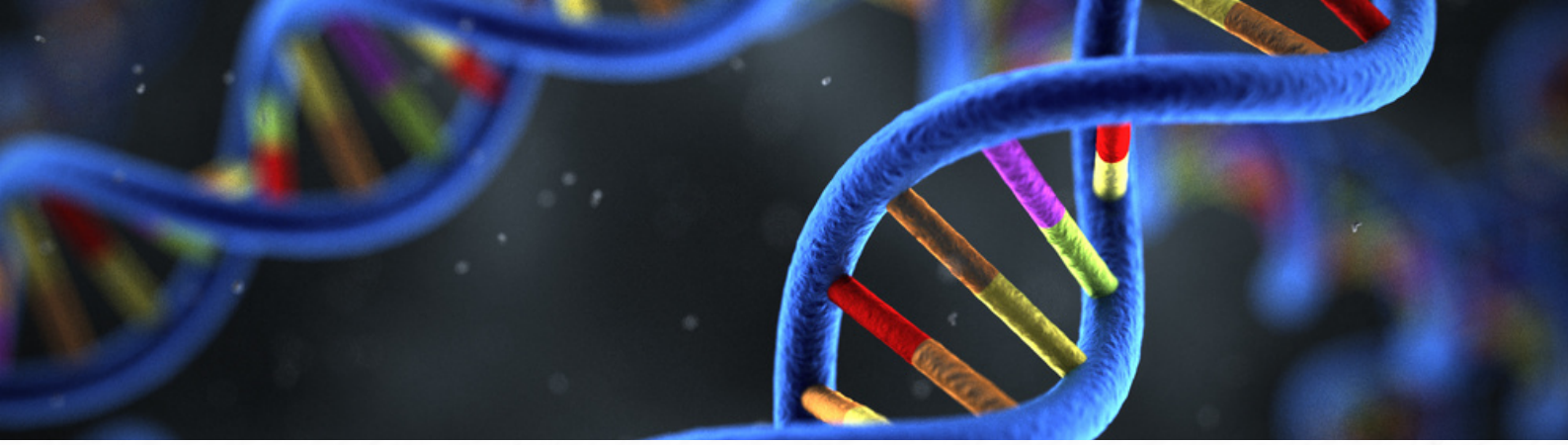
- Introduction to Cloud Computing for Bioinformatics: Concepts and Advantages
 - Overview of Amazon Web Services (AWS) for Bioinformatics Data Analysis
 - Setting up an AWS Account and Access Management for Bioinformatics Workflows
 - Deployment Strategies for Bioinformatics Workflows on AWS: EC2, Lambda
 - 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
 - Applications of Machine Learning and AI in Bioinformatics: Clustering
 - Applications of Machine Learning and AI in Bioinformatics: Regression
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MODULE : 18

RESEARCH PUBLICATION

MODULE : 19

MANAGE YOUR WORK TO MEET REQUIREMENTS

MODULE : 20

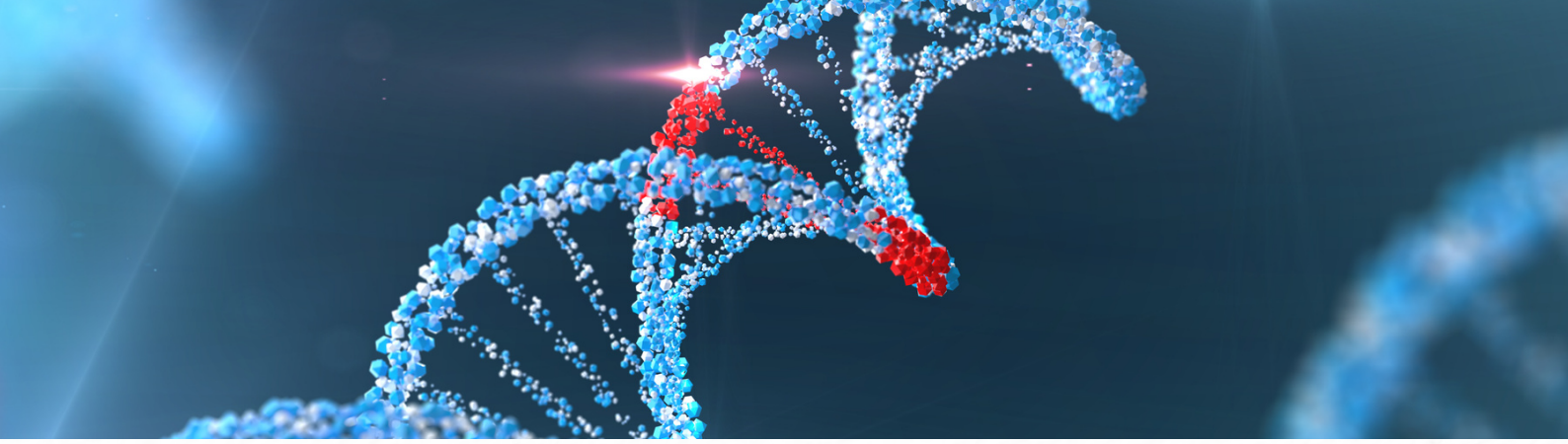
WORK EFFECTIVELY WITH COLLEAGUES

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.



CONTACT

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Thank you!

OUR CERTIFICATIONS & GRANTS