



**LSSSDC (GOVT. OF INDIA)
CERTIFIED 28 CREDIT COURSE**







BIOINFORMATICS ANALYST

Empowering Your Career through Practical
Training and Industry Recognition

www.dromicslabs.com



Why DrOmics Labs

1	2	3	4	5	6
					
<p>Strategic Partnership</p> <ul style="list-style-type: none"> • MoU with Andhra Pradesh Government for internship • Most prestigious institute IIT Delhi as the Incubation Hub 	<p>Certifications Achieved :</p> <ul style="list-style-type: none"> • MSME Certification • Recognized by Startup India • ISO Certification Attained • AWS Grant Awarded • Skill India Certified 	<p>Successfully trained over 5000 students hailing from diverse corners of the world</p>	<p>Becoming professionals' top choice: 10000 LinkedIn followers in a short time.</p>	<p>Engaging in collaborative discussions with multiple universities for student internships</p>	<p>Rapidly expanding business connections in the Life sciences industry and global research arenas, fostering robust networks in India and abroad</p>



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Key Features of Our Course:

1. **28 Credit worth Comprehensive Learning:** Our intensive course is 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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Are You Interested in **Scholarship** for This Course ?

ELIGIBILITY

- Masters in any life science field / MSc (2nd yr pursuing)
- Those holding higher degrees in life science disciplines.
- Professionals with experience in Bioinformatics.

SCHOLARSHIP EXAM DATE
26 MAY 2024

SCHOLARSHIP

90%+ Marks

60000/- INR

*Scholarship (only for top 3 students)

80-90% Marks

20000/- INR

Scholarship

70-80% Marks

15000/- INR

Scholarship

60-70% Marks

10000/- INR

Scholarship





MODULE : 1

ORIENTATION FOR BIOINFORMATICS OCCUPATION

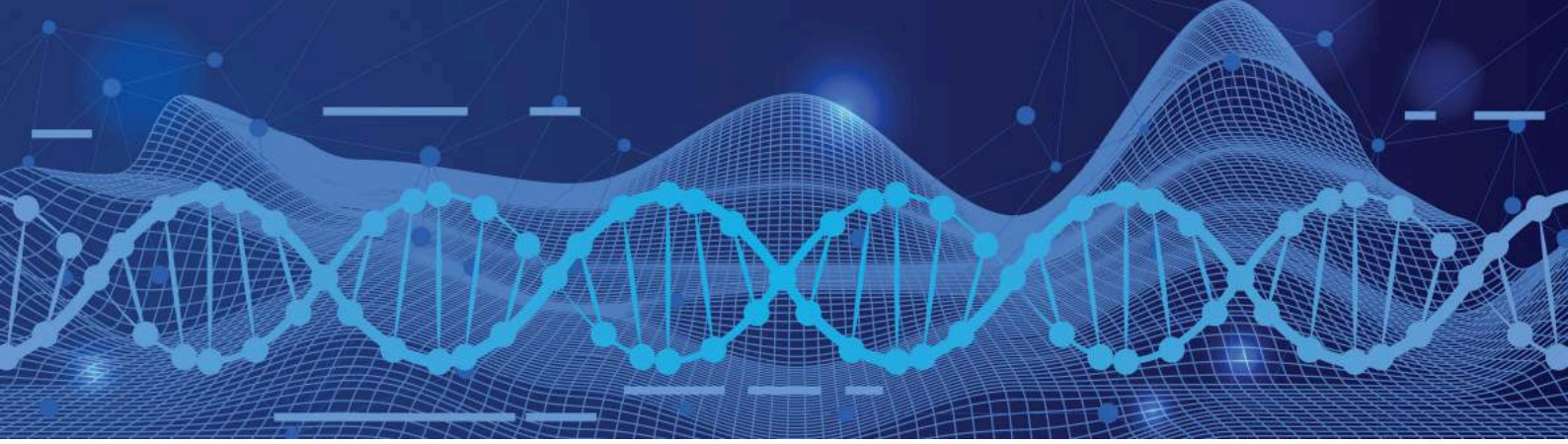
- Introduction to Bioinformatics and its Applications in Life Sciences
 - Career Pathways and Opportunities in Bioinformatics
 - The Interdisciplinary Nature of Bioinformatics: Bridging Biology and Computer Science
 - Organizational Structure and Employment Benefits in the Life Sciences Industry
 - Regulatory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

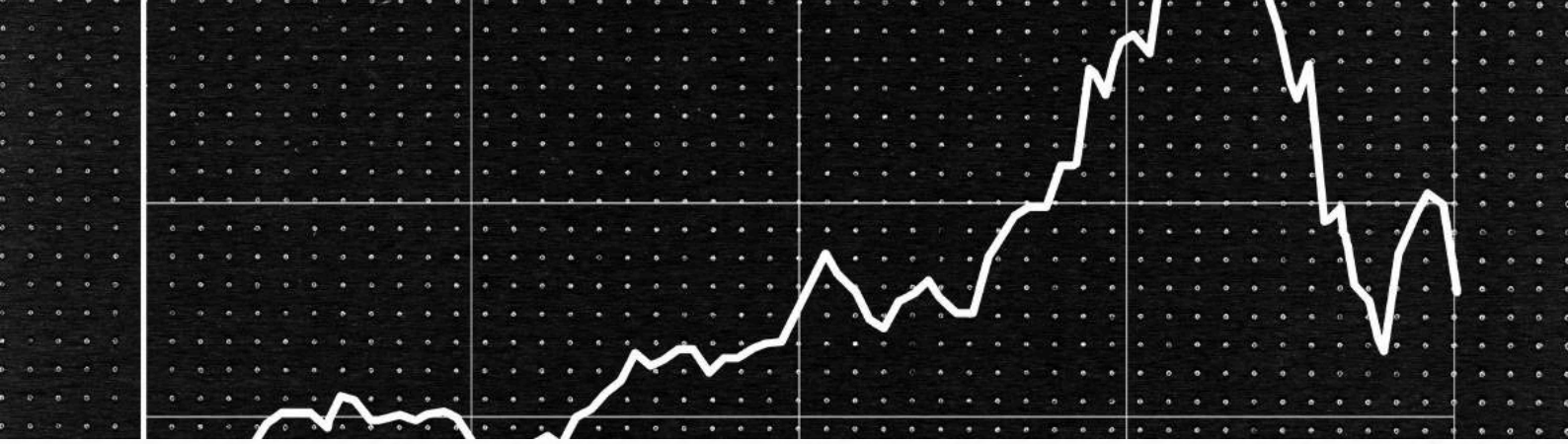
- Introduction to Python language
 - Data types and data structure
 - Control statements: if -else, If-elif-else, for loop, while loop
 - Python data structure : List, Set, Tuple, Dictionary
 - Methods of List, Slicing and indexing in List and Tuple
 - Functions : Function introduction and its requirement, 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

MACHINE LEARNING AND IMAGE ANALYSIS

- Introduction to Machine Learning Fundamentals for Bioinformatics
 - Linear Models and Nearest Neighbors: Learning Algorithms and Regularization
 - Basics of Probabilistic Machine Learning and Its Applications in Bioinformatics
 - Implementing Support Vector Machines (SVM) and Kernel SVM in Python
 - Introduction to Naive Bayes Classifier and Its Use in Bioinformatics
 - Decision Tree Classifier and Random Forest Classifier: Theory and Implementation
 - Logistic Regression in Bioinformatics: Concepts and Practical Applications
 - Introduction to Clustering Algorithms: K-Means and Its Application in Bioinformatics
 - Validation of Machine Learning Models: Techniques and Accuracy Metrics
 - Theoretical Concepts and Practical Aspects of Machine Learning for Image Analysis in Bioinformatics
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MODULE : 9

STATISTICAL METHODS AND TOOLS FOR DATA EXTRACTION AND PREPARATION

- Introduction to Statistical Methods for Data Extraction and Preparation in Bioinformatics
 - Exploring Data Characteristics and Distribution: Descriptive Statistics and Data Structures
 - Understanding Correlation and Regression Analysis in Bioinformatics
 - Probability and Bayes Theorem: Foundations for Statistical Inference
 - Sampling Techniques and Distribution Theory in Bioinformatics
 - Hypothesis Testing: Concepts and Methods for Data Analysis
 - Statistical Tools for Data Management, Analysis, and Visualization in Bioinformatics
 - Inferential Statistics: Making Valid Generalizations from Sample Data
 - Interpreting Statistical Outputs for Informed Decision Making in Bioinformatics
 - Practical Applications: Applying Statistical Methods to Solve Bioinformatics Problems
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MODULE : 10

DATA MINING

- Introduction to Data Mining in Bioinformatics: Concepts and Applications
 - Understanding Data Warehousing: Life Cycle and Implementation
 - Classification and Clustering Techniques for Data Analysis in Bioinformatics
 - Outlier Analysis: Identifying Anomalies in Bioinformatics Data
 - Overview of Forecasting Techniques in Bioinformatics
 - Introduction to Hadoop and its Role in Big Data Analytics
 - Exploring the R Language for Statistical Computing and Data Analysis
 - Data Analytics Project Life Cycle: Planning, Execution, and Evaluation
 - Strategies for Importing Data from Different Databases for Analysis
 - Practical Applications: Performing Data Mining from Large Data Sources in Bioinformatics
-



MODULE : 11

BASICS OF ALGORITHM DEVELOPMENT AND IMPLEMENTATION

- Introduction to Program Design: Principles and Methods
 - Basic Structures for Algorithm Development
 - Pros and Cons of Efficient and Naïve Algorithms
 - Structured Programming Rules
 - Divide and Conquer Technique for Problem Solving
 - Algorithm Definition in Structured Language
 - Algorithm Correctness Verification
 - Data Validation and Error Handling in Algorithm Design
 - Optimization Techniques for Algorithm Efficiency
 - Practical Application of Program Design Principles in Bioinformatics
-



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

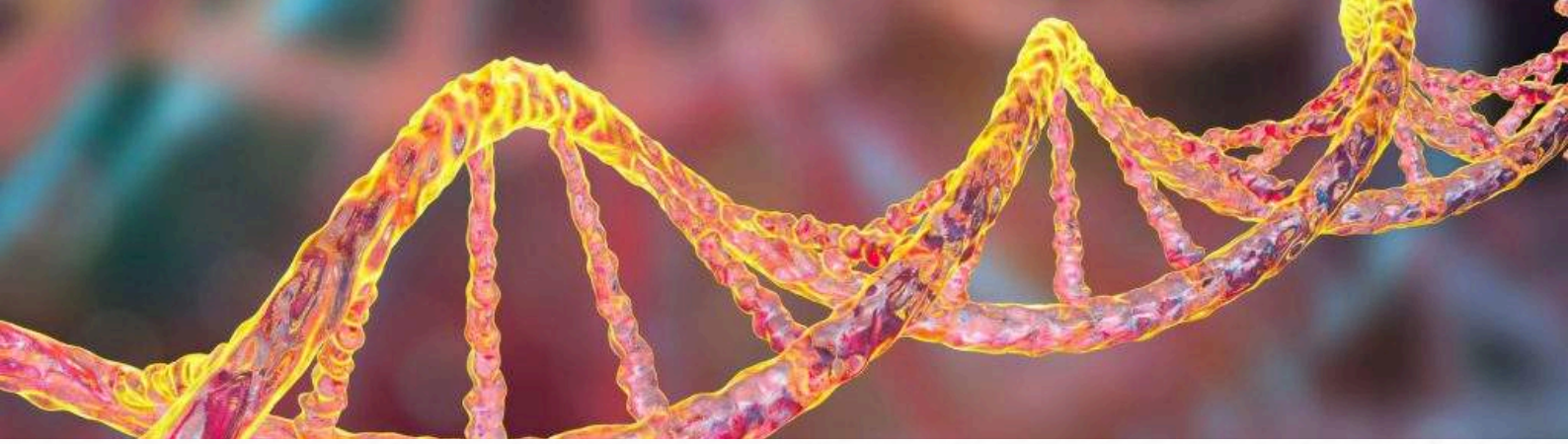
- Introduction to NGS and DNaseq
 - Basic Terminologies in NGS
 - Understanding of SRA database
 - Tools installation in Linux for Variation Calling
 - Quality control (FastQC)
 - Trimming of Reads (Trimmomatic)
 - Indexing of Genome (BWA) and Alignment of Reads (BWA)
 - Variation calling using GATK
 - Variant Effect Prediction(VEP)
 - Variation Visualization (IGV)
-



MODULE : 14

BIOLOGICAL DATA ANALYSIS

- 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

GENE EXPRESSION ANALYSIS USING MICROARRAY

- Introduction to Microarray
 - Data Downloading using GEO dataset
 - Microarray Pipeline using R programming language
 - Annotation of DEG
 - Functional and Pathway Enrichment Analysis
 - Network Analysis
 - Visualization of DEG using R plot (Volcano Plot and Heatmap)
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MODULE : 17

AWS

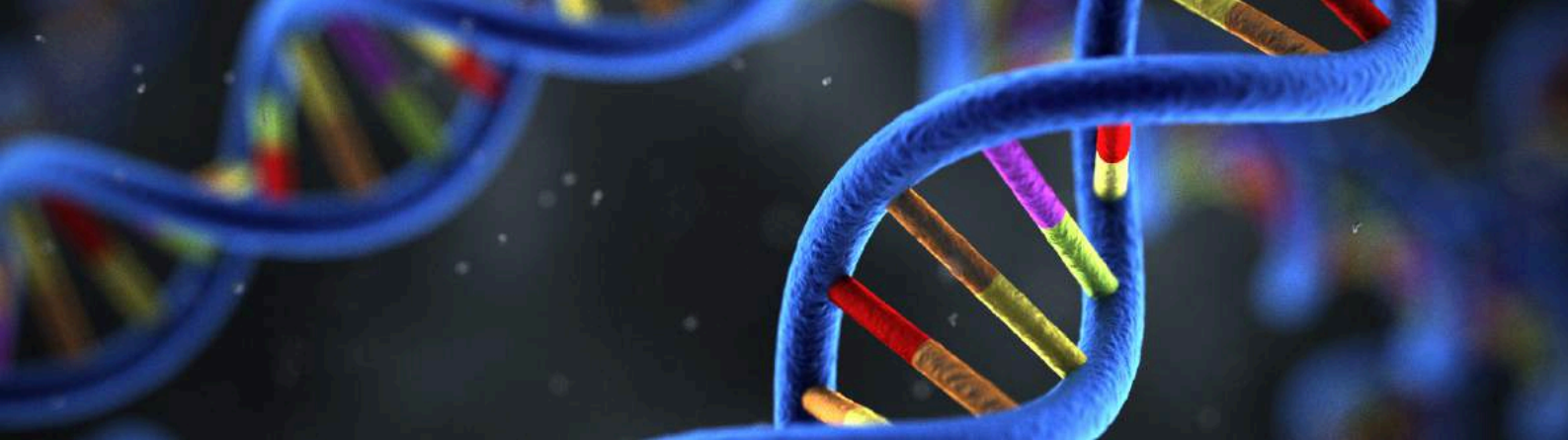
- Introduction to Cloud Computing for Bioinformatics: Concepts and Advantages
 - Overview of Amazon Web Services (AWS) for Bioinformatics Data Analysis
 - Setting up an AWS Account and Access Management for Bioinformatics Workflows
 - Deployment Strategies for Bioinformatics Workflows on AWS: EC2, Lambda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

SQL

- Introduction to SQL (Structured Query Language) for Bioinformatics
 - Basic SQL Syntax and Data Types: Queries, Statements, and Operators
 - Retrieving Data from Relational Databases: SELECT Statements and Filtering
 - Manipulating Data in Relational Databases: INSERT, UPDATE, and DELETE Statements
 - Joining Tables: Understanding INNER JOIN, LEFT JOIN, and other Join Types
 - Aggregating Data: Using GROUP BY and Aggregate Functions in SQL
 - Database Management Tasks: Creating, Modifying, and Dropping Tables
 - Indexing and Optimization Techniques for Database Performance
 - User Management and Security in Relational Databases
 - Backup and Recovery Procedures: Ensuring Data Integrity and Availability
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MODULE : 19
EMPLOYABILITY SKILLS

MODULE : 20
WORK MANAGEMENT

MODULE : 21
MANAGE YOUR WORK TO MEET REQUIREMENTS

MODULE : 22
WORK EFFECTIVELY WITH COLLOGUES

MODULE : 23
**BUILD AND MAINTAIN RELATIONSHIP AT
WORKPLACE**

MODULE : 24
BUILD AND MAINTAIN CLIENT SATISFACTION



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