Dr.Omics Labs
The Doctor of your DNA

NAVIGATING THE FUTURE

A **6 Month**
Research-Driven CADD Journey

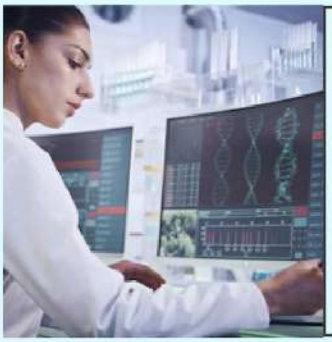
WWW.DROMICSEDU.COM

YOUR GO TO

With Dr.Omics Labs

COMPREHENSIVE AND SPECIALIZED TRAINING

- MODULES COVERING KEY AREAS OF COMPUTAIONAL RESEARCH.
- HIGHLY PROFESSIONAL COURSES FOR COMPUTER AIDED DRUG DESIGNING TECHNIQUES & PROGRAMMING FROM BASICS.



EXPOSURE TO INDUSTRY PRACTICES AND INSIGHTS INTO THE COMMERCIAL ASPECTS OF BIOTECH RESEARCH

- AN INDUSTRIAL LEVEL COURSE DESIGN.
- COVERING EVERY TOPIC REQUIRED FOR COMPUTATIONAL DRUG DESIGNING & PROVIDING HANDS-ON PRACTICE DURING SESSION

MENTORSHIP FROM INDUSTRY EXPERTS AND RENOWNED RESEARCHERS.

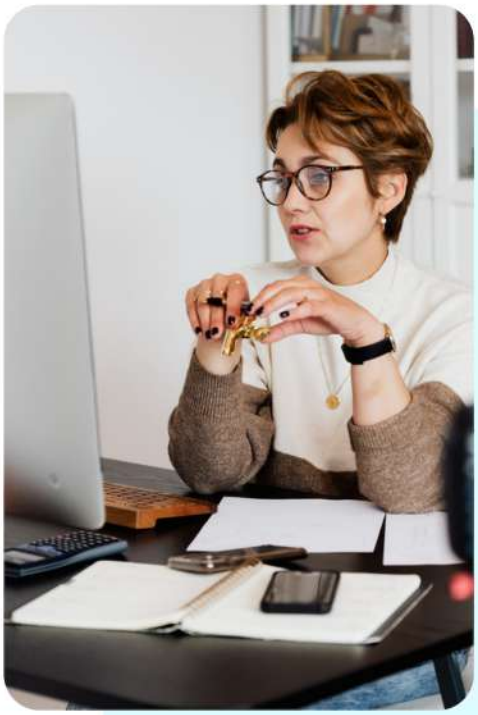
- LIVE LEARNING WITH HANDS-ON PRACTICAL EXPERIENCE, UNDERSTANDING USAGE OF BIOINFORMATICS DATABASES IN REAL-TIME.
- IDENTIFY DRUG TARGETS, ANALYZE MOLECULAR DOCKING AND BINDING MODES,INVESTIGATE DRUG REPOSITIONING AND DESIGN NEW DRUGS.

NETWORKING

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

CADD: Research Oriented Course

"Explore the forefront of proteomics and bioinformatics with our CADD Research Oriented Course at Dr.Omics Labs. Gain hands-on expertise in drug designing techniques and MD Simulation, propelling your career or research to new heights in the field of proteomics."



Important tip

"Select a topic that really interests you and join our research-oriented course made for passionate learners. Our flexible schedule is made to fit your time."

A 6-Month CADD Research Journey:

A CADD (Computer-Aided Drug Design) research-oriented course offers a comprehensive exploration of computational methods used in drug discovery. Students delve into molecular modeling, ligand-receptor interactions, and virtual screening, equipping them with valuable skills to contribute to pharmaceutical research. This course fosters a deep understanding of the intersection between chemistry, biology, and cutting-edge computational tools.

Coursework Overview

1. Beginners to advanced Bioinformatics
2. Linux, Cloud Computing and its application in CADD
3. Python and its application in CADD Techniques
4. R and its application in CADD Techniques
5. Computer Aided Drug Designing (CADD)
6. Machine Learning in Drug Designing
7. Research Project CADD 2 month

MODULE 1:

BEGINNERS TO ADVANCED BIOINFORMATICS

- Introduction to Bioinformatics
- NCBI Database Overview
- Genbank Database Practical Exercises
- UCSC Genome Browser Overview
- UCSC Genome Browser Hands-on Exercises
- Pubmed Database Introduction
- Clinvar Database Overview
- KEGG Database Overview and Exercises
- Protein Databases Overview
- Protein Data Bank (PDB) Overview
- Online BLAST Introduction and Exercises
- Standalone BLAST Setup and Initial Exercises
- Standalone BLAST Advanced Exercises
- Multiple Sequence Alignment with ClustalW
- Multiple Sequence Alignment with MEGA

MODULE 2:

LINUX, CLOUD COMPUTING AND ITS APPLICATION IN CADD

- 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 AND ITS APPLICATION IN CADD 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

python

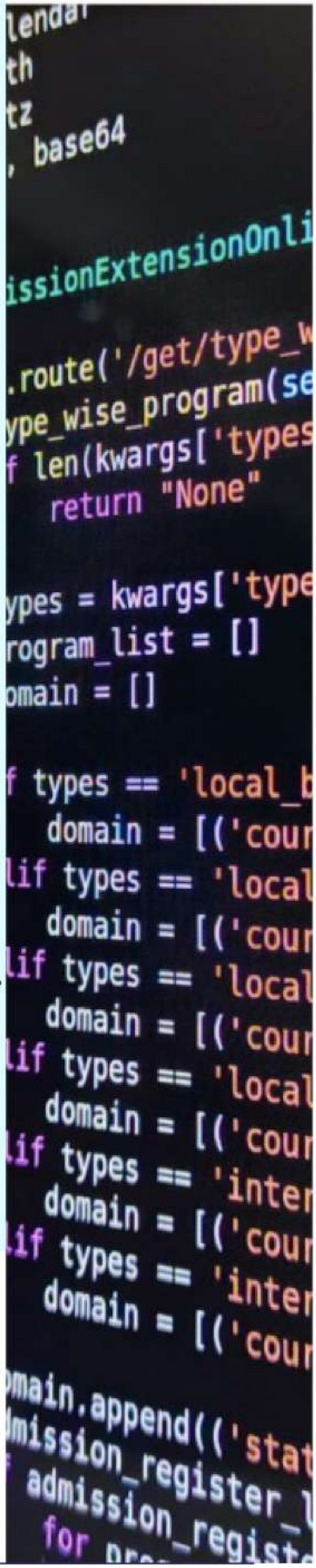
3.2. Biopython

- 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)

biopython

MODULE 4:

R AND ITS APPLICATION IN CADD TECHNIQUES



4.1. R Programming

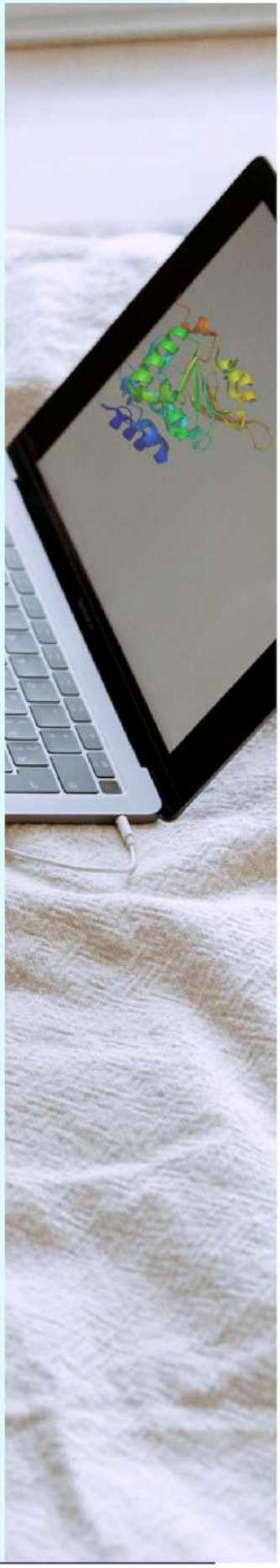
- Introduction to the R language
- Importance of R in Bioinformatics
- Installation of R
- Installation of IDE (R studio)
- Print, cut, and paste functions
- Comments
- Variables
- Data types
- Functions of math
- Operators
- Installation of packages
- String formatting
- Learning Control Statements (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)

Bioconductor
OPEN SOURCE SOFTWARE FOR BIOINFORMATICS

MODULE 5:
COMPUTER AIDED DRUG DESIGN (CADD)



- **Introduction to Drug Discovery and Computer Aided Drug Design**
  - Overview of drug discovery process
  - Role of computational methods
  - Hands-on: Introduction to ChemDraw or ChemSketch for chemical structure visualization.
- **Molecular Biology Fundamentals for Drug Design**
  - Biomolecules and their properties
  - Structure of proteins and ligands
  - Hands-on: Utilize PyMOL or Swiss
  -PdbViewer for protein structure visualization.
- **Molecular Modeling Techniques**
  - Molecular visualization tools
  - Molecular mechanics and dynamics simulations
  - Hands-on: Use PyMOL, UCSF Chimera, or VMD for molecular visualization.
- **Chemical Informatics and Virtual Screening**
  - Chemical databases and data mining
  - Ligand and structure-based virtual screening
  - Hands-on: Explore tools like PubChem for chemical data and Autodock Vina for virtual screening

MODULE 6:
MACHINE LEARNING IN DRUG DESIGN

- **Introduction to Machine Learning**
  - Basics of machine learning
  - Supervised, unsupervised, and reinforcement learning
  - Hands-on: Learn the basics with the scikit-learn library in Python.
- **Data Preprocessing for Drug Design**
  - Data cleaning and feature selection
  - Handling molecular data
  - Hands-on: Use Pandas and NumPy for data preprocessing.
- **Machine Learning Models for Drug Design**
  - Regression and classification algorithms
  - Deep learning in drug discovery
  - Hands-on: Implement machine learning models using scikit-learn and TensorFlow/Keras.
- **Applications of Machine Learning in Drug Design**
  - Predicting drug-target interactions
  - QSAR modeling
  - Hands-on: Apply machine learning to real datasets with RDKit and Cheminformatics.
- **Drug Optimization and Lead Identification**
  - Structure-activity relationship (SAR) analysis
  - De novo drug design using ML
  - Hands-on: Use RDKit for SAR analysis and explore de novo design tools

Program Structure

- **Duration: 6 months**
- **Coursework: 4 months**
- **Project: 2 months**

Gain expertise in CADD techniques

4 Months of In-Depth Learning

- Molecular modeling
- Virtual screening
- Drug-target interaction analysis
- Pharmacokinetics and pharmacodynamics

2 Months of Real-World Application

- Collaborate on a cutting-edge research project.
- Apply acquired skills to solve industry challenges.
- Gain hands-on experience with CADD.
- Work closely with mentors and industry professionals.

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.

Need more insight & support?

CONTACT US!

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Thank you!

Dr.Omics Labs
The Doctor of your DNA

OUR CERTIFICATIONS & GRANTS

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