Bioinformatics Winter Training

NTHRYS provides Bioinformatics Winter Training for interested candidates at its Hyderabad facility, Telangana. Please refer below for more details including Fee strctures, Eligibility, Protocols and Modules etc.,. Please do call / message / whatsapp for more details on 9014935156 [India - +91]

Eligibility: BSc / BTech / MSc / MTech / MPhil / PhD in any Life Sciences studying or completed students

Protocols / Techniques Covered

In the present scenario as the demand for accurate, faster and qualitative research increased, this led to the advent of bioinformatics. Bioinformatics as a tool where errors made can be corrected to open newer approaches in R&D fields. With the advent of Bioinformatics we can develope and carry out research in various areas like nanotechnology, biochemistry, crop research, environmental biotechnology. The basic information of biology one can gains through training in bioinformatics is now a pre-requisite for any life sciences graduate.The recent rise in organism specific genome projects coming up from scientist desks, bioinformatics becomes the foundation to start these projects. It helps to develope research, start new research, maintain and organize the data and decode the results. On a global perspective in order to receive faster results bioinformatics is a necessary tool to embark on a career in life sciences division is bioinformatics.
Bioinformatics Training Program at NTHRYS is provided under three different modules:

1. ## Basic Bioinforrmatics Training Module

Module I		
Theory	**Practical**	**Tools**
History	Biological Databases	NCBI,MMDB,EMBL,DDBJ,SwissProt
Origin	Structure DB	PDB,CATH,SCOP,InterproScan,Signal Scan
Scope of Bioinformatics	Importance of Tools	N/A
Origin of Tools	Sequence DB’s	Scan,Prosite,Prodom, MotifScan,PFam
Sequence File Formats	Types	Genebank file format,FASTA format,EMBL format,UniprotKB/Swiss-Prot format, PIR/NBRF format

Module II		
Application of Bioinformatics	Gene Prediction & Functional Analysis	ORF finder, GeneScan,GeneMark,Webgene
Sequence Comparison	EXPASy, EMBOSS	BLAST,Clustalw,DIALIGN
Structure File Formats	Repeat detection	Repeat Masker, dnadot
General Introduction to Molecular Biology	Hydrophobicity	Protparam
Restriction Site Mapping	Restriction site Detection	Webcutter,NEBCutter
Visualiztion Software	System Biology Vs /w	RasMol,SPDBV,JMol,Cn3D
Phylogenetic Analysis	Evolutionary Relationship	Phylogeny,HHperd, Biology workbench
Bioinformatics Dogma	Thermodynamics	ProTherm
Minor Project Concerning the concepts learnt		

2. Advanced Bioinformatics Training Module

Theory	**Practical**	**Tools**
Module III		
Statistical significance of Alignments	RNA sequence Analysis	Expasy
Sequence Databases for similar sequences	RNA fold Recognition	MFOLD,PFOLD
RNA sequence analysis	Secondary Structure Prediction	GOR4, ChouFasman, Predator, Phobious, HMMTOP
RNA structure Prediction	Abinitio Structure Prediction	QUARK,Bhageerath
Submitting Sequence	To NCBI	N/A
Scoring Types	PAM,BLOSUM	N/A
Types of Alignment	Global & Local	Grapics Sequences Pairwise BLAST & EMBOSS Aligns
Module IV		
Molecular Phylogeny Prediction	Molecular evolutionary genetic Analysis	MEGA5,PHYLIP
EST and Gene Discovery		dbEST
Genome Analysis		Genid,FGNEGH,GLIMMER,GRAIL
Comparative modeling	Homology Modeling	MODELER, Swiss Model
Fold recognition	Threading	RAPTOR,3DPSSM,HHPRED
Model Evaluation	Structure Refinement	WHATCHECK,SAVES Server
Structure Validation	RMSD plot	CASP Server
Module V		
Molecular Dynamics	Molecular Simulation	GROMACS,HOOMD blue,PYMOL
Molecular Modeling		CHARM-GUI,Amber
Primer Desinging	Three Primer designing tools along with concepts of behind tools	FastPCR,PRIMER3,Gene Fisher
Concepts of Biostatistics,biophysicsand biochemistry to help in dealing with databases/tools	Various tools used to useges, of subject with bioinformatics	Risk assessment tools,KinCohort software MultAssoc,Genetic Pathway analysis software
Minor project work in desired topic		

Major project in desired topic

Note: Major project as well as Minor project can also done by the student after selected time and respective certification can be issued on the respective date. For example if a MSc first year student joins in this training module he/she can complete the training module and take Training and take training certificate at the time and later come back after few months continue doing the minor project and then collect the certificate and come later at the time of final year academic project time and do the major project and collect the certificate for the same in respective dates and make use of the three certifications for a single fee structure.

This module was designed after considering the advices given by the Bioinformatics Head of the departments of many reputed universities.

3. Pofessional Bioinformatics Training Module

Theory	Practicals	Tools Used
Module VI		
Reconstruction Of Metabolic Pathway		Various pathway construction tools including KEGG
Pathway Databases		KEGG [all databases]
Monte Carlo Simulation		Molecular dynamics tools
Docking of Small Molecules	Docking Software	GOLD, HYPERCHEM, AutoDOCK, Hex, Argus Lab
Module VII		
Energy minimization	QSAR Studies	Build QSAR
Geometry Optimization	Descriptor Database	E-Dragon
Force Fields	Primer Designing	Primer3, FastPCR
Descriptors		
BioPERL	BioPERL / PERL programming	
Antibody engineering	Designing and modeling antibodies	
HTML concepts	HTML	
Concepts on designing a bioinformatics database		
Concepts on various biotechnology aspects		
Major project work in any one of the fields present in NTHRYS Bioinformatics Projects section.		

Expertise Training Module on QSAR

Module VIII		
Topic	Practical Approaches	Software / Tools
Free Energy Relationships	Hansch method : Linear Free Energy Relationships (physicochemical properties)	QSAR-PC: PAR
	Martin & Kubinyi : Non Linear Free Energy Relationships (physicochemical properties)	
	Free Wilson mathematical model (structural elements)	
Molecular Modeling	Curation	KNIME
	Molecular Descriptors (0D, 1D, 2D, 3D, 4D, 5D, 6D)	Chemistry Development Kit, PADel, RDKit, MOE, PubChem, Chemotypes
	Modeling Methods 1. K-Nearest Neighbors (kNN) 2. Random Forest 3. Support Vector Machines (SVM)	ACD/ChemSketch, ACD/3D Viewer, Biomer, MOLEKEL, The Molecular Modelling Toolkit etc.,
Quantum Mechanical Model	1. Linear Scaling Methods 2. QM/MM (Quantum Mechanics /Molecular Mechanics) 3. QM Simulation 4. Protonation States 5. Cation-π and π-π interactions 6. Using QM to calculate molecular properties 1. QM derived FFs (Force Fields) 2. QM Derived Partial Charges 3. QM Descriptors in QSAR/QSPR (Quantitative Structure Property Relationship) 4. Molecular Quantum similarity measures 5. Variation particle number approach for molecular design	AlgoGen, ProToss, Epik etc.,

Topological Method	1. The Wiener Index 2. The Platt and Gordon-Scantlebury Indices 3. The Hosoya Index 4. The Zagreb Indices 5. The Balaban J Index 6. Information Content Indices 7. Autocorrelation Descriptors 8. WHIM Descriptors 9. Topochemical Atom Indices 10. The Centric Index 11. Triplet Indices 12. The Randi? Index 13. Molecular Connectivity Indices 14. Kappa Indices 15. Flexibility Indices 16. The Variable Connectivity Index 17. Topological Descriptors in Inverse QSAR 18. Electrotopological State Indices 19. Biodescriptors 20. Chirality	ADAPT, CODESSA, MathChem, MDL QSAR, TOPIX, etc.,
Pattern Recognization		

Fee for Module VIII

Module VIII (Online Mode Only) - $1500 for 1 Month Duration (Training + 1 Minor Project) , $3000 for 3 Months Duration (Training + 1 Major Project + Publication Assistance as Co author Only), $2000 additional for First Authorship Publication Project Assistance along with training.

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Fee details in Rs per student					
Fee	5 Days	10 Days	20 days	1 Month	45 Days
Individual	11900	12500	15800	19600	23200
Group 2 - 4	11400	11400	15100	18700	22100

Group 5 - 7	11200	11200	14900	18500	21900
Group 8 - 10	11100	11100	14800	18300	21700