BIOINFORMATICS • MULTIPLE ALIGNMENT
INDUSTRIAL SKILL DEVELOPMENT

NTHRYS

OPC PVT LTD

CATALOGUE 03 • NBMS

Multiple Alignment & Profile Methods

A complete industrial catalogue of hands-on training modules in multiple sequence alignment and profile-based analysis — from progressive and consistency-based alignment to trimming and curation, profile HMM construction, family assignment, conservation and motif discovery, and the downstream analyses alignments feed. Every module is issued against its own controlled protocol, contact-hour allocation and published fee.

59 PROTOCOL-BACKED MODULES • 10 CATEGORY STREAMS
1606 CONTACT HOURS • 2026 EDITION

59	10	1606	59
MODULES	STREAMS	HOURS	PROTOCOLS

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NTHRYS BIOINFORMATICS SERIES · CATALOGUE 03

CATALOGUE OVERVIEW

Program Categories at a Glance

This catalogue lists every multiple-alignment and profile method our training programs are equipped to operate and teach, organised into 10 technology streams. Each module carries a unique product code, a controlled protocol document, an individually assessed contact-hour allocation and its own published fee. No two protocols are priced alike — duration and fee follow the methodological depth, compute load and assessment weight of that specific module.

STREAM	CATEGORY	FOCUS DESCRIPTION	MODULES	HOURS	DAYS	BUNDLE (INR)
NBMS-FD	**MSA Foundations & Objective Functions**	Scoring, guide trees, refinement & confidence	6	146	26	43,900
NBMS-TL	**Standard MSA Tools & Operation**	Clustal, MUSCLE, MAFFT, T-Coffee & PRANK	6	158	29	48,400
NBMS-LG	**Large-Scale & Specialised Alignment**	Scale, divergence, codon & structure-guided modes	6	188	33	58,900
NBMS-QC	**Alignment Quality, Trimming & Curation**	Metrics, reliability scoring, trimming & editing	6	144	26	43,900
NBMS-FM	**Alignment Formats, Conversion & Handling**	Formats, coordinates, concatenation & slicing	5	106	19	32,000
NBMS-PF	**Profile & Position-Specific Models**	PSSMs, weighting, logos & profile HMM building	6	178	32	55,300
NBMS-HM	**HMM Search, Annotation & Family Assignment**	Domain assignment, cutoffs & proteome annotation	6	180	32	56,300
NBMS-CN	**Conservation & Motif Discovery**	Conservation scoring, motifs, covariation & mapping	6	174	32	54,100
NBMS-DS	**Downstream Use of Alignments**	Phylogeny, selection, variants & design inputs	6	166	30	51,400
NBMS-AU	**Automation, Scripting & Visualisation**	Scripted alignment, figures & reproducible reporting	6	166	30	51,700
Complete NBMS catalogue			**59**	**1606**	**289**	**379,400**

HOW TO READ A MODULE CODE

NBMS – FD – 01

NBMS
Nthrys Bioinformatics catalogue — Multiple Alignment & Profile Methods

FD
Category stream code

01
Module number within the stream

HOW TO READ A PROTOCOL REFERENCE

PRT/NBMS/FD/01

PRT
Controlled protocol held in the training SOP register

NBMS/FD/01
Maps one-to-one to the module code alongside

Bundle figures are the discounted price for enrolling in every module of that stream together. Individual module hours and fees are printed on each category page. All fees exclude applicable GST.

Every Module Is a Controlled Protocol

There is no flat course fee in this catalogue. Each module is written up as its own protocol document, timed against the work it actually contains, and priced on that basis — contact hours, algorithmic and compute load, number of tools operated and the depth of the assessment task.

CONTENTS OF EVERY PRT DOCUMENT

01 **Scope & competency statement**
What the trainee will be able to do on completion, mapped to the module code.

02 **Resource inventory**
Tools, versions, reference databases and datasets recorded before start.

03 **Stepwise procedure**
Numbered operations with decision points, parameters and expected intermediates.

04 **Worked reference exercise**
A supplied query and subject set with the correct output for self-verification.

05 **Acceptance criteria**
The result a trainee must reproduce for the protocol to be signed as complete.

06 **Failure modes & troubleshooting**
Known error states, misleading hits and how each is resolved.

07 **Assessment task & marking**
The independent task, its weighting and the pass threshold.

08 **Completion record**
Trainer sign-off, date, hours logged and certificate serial entry.

MODULE DURATION RANGE

16 – 40 hours

Allocated per protocol, not per tier. A scoring-concepts module runs 16 hours; profile-profile remote homology detection runs 40.

MODULE FEE RANGE

INR 5,500 – 14,900

Set individually against each protocol. Iterative profile search, genome-scale alignment and pipeline construction carry the highest compute and supervision load.

1606	289	59
TOTAL HOURS	TOTAL DAYS	PROTOCOLS

ENROLMENT OPTION	SCOPE	HOURS	FEE (INR)	SAVING
Single Module	Any one module code, priced as printed on its category page	**16 – 40**	**5,500 – 14,900**	—
Stream Bundle	Every module within one category stream	**106 – 188**	**32,000 – 58,900**	15%
Core MSA Track	Streams FD, TL, LG, QC, FM — 29 modules	**742**	**208,600**	22%
Professional Track	Streams FD through CN — 47 modules	**1274**	**332,900**	28%
Complete NBMS Catalogue	All 10 streams — 59 modules, 59 protocols	**1606**	**379,400**	35%

WHAT THE MODULE FEE INCLUDES

- **Workstation access** — dedicated Linux workstation for the logged hours of the module
- **Issued protocol** — the controlled PRT document, retained by the candidate
- **Reference datasets** — query sets, subject databases and verified reference outputs
- **Certification** — serially numbered certificate quoting module code, protocol reference and hours
- **Post-training support** — 60 days of query support by email

ENROLMENT & PAYMENT TERMS

- **Registration** — INR 1,000 per candidate, adjusted against the module fee
- **Taxes** — GST applicable at prevailing rates over and above listed fees
- **Live-online mode** — 80% of the listed on-campus fee for eligible modules
- **Concessions** — 10% for groups of three or more; 15% against a valid institutional identity card
- **Scheduling** — rolling monthly intakes; custom dates for institutional groups
- **Validity** — fees quoted for the 2026 edition, confirmed at the time of enrolment

01

CATEGORY • NBMS-FD

MSA Foundations & Objective Functions

Scoring, guide trees, refinement & confidence

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-FD-01	**Homology, Conservation & the Purpose of MSA** What an alignment asserts and where it misleads.	PRT/NBMS/FD/01	16 HOURS	03 DAYS	5,500
NBMS-FD-02	**Sum-of-Pairs Scoring & Objective Functions** Column scoring, weighting & optimisation targets.	PRT/NBMS/FD/02	22 HOURS	04 DAYS	7,700
NBMS-FD-03	**Progressive Alignment & Guide-Tree Construction** Distance estimation, tree building & error propagation.	PRT/NBMS/FD/03	28 HOURS	05 DAYS	9,900
NBMS-FD-04	**Iterative Refinement Strategies** Partition refinement & escaping local optima.	PRT/NBMS/FD/04	26 HOURS	05 DAYS	9,200
NBMS-FD-05	**Consistency-Based Alignment Scoring** Library construction & consistency transformation.	PRT/NBMS/FD/05	30 HOURS	05 DAYS	10,800
NBMS-FD-06	**Alignment Uncertainty & Confidence Assessment** Column support, replicate alignment & reporting.	PRT/NBMS/FD/06	24 HOURS	04 DAYS	8,600

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 146 HOURS • 26 DAYS

~~51,700~~ 43,900 INR

Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

02

CATEGORY • NBMS-TL

Standard MSA Tools & Operation

Clustal, MUSCLE, MAFFT, T-Coffee & PRANK

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-TL-01	**Clustal Omega & ClustalW Operation** HMM-guided clustering, options & output control.	PRT/NBMS/TL/01	20 HOURS	04 DAYS	7,000
NBMS-TL-02	**MUSCLE Alignment Workflows** Draft, refinement stages & speed/accuracy modes.	PRT/NBMS/TL/02	22 HOURS	04 DAYS	7,700
NBMS-TL-03	**MAFFT Strategy Selection & Tuning** FFT-NS, L-INS-i, E-INS-i & G-INS-i in practice.	PRT/NBMS/TL/03	32 HOURS	06 DAYS	11,700
NBMS-TL-04	**T-Coffee & Consistency Modes** Library modes, scoring output & combination runs.	PRT/NBMS/TL/04	30 HOURS	05 DAYS	10,900
NBMS-TL-05	**Phylogeny-Aware Alignment** Insertion-aware alignment for evolutionary inference.	PRT/NBMS/TL/05	26 HOURS	05 DAYS	9,500
NBMS-TL-06	**Tool Selection & Parameter Benchmarking** Reference-set comparison & documented selection.	PRT/NBMS/TL/06	28 HOURS	05 DAYS	10,200

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 158 HOURS • 29 DAYS — ~~57,000~~ 48,400 INR

Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

03

CATEGORY • NBMS-LG

Large-Scale & Specialised Alignment

Scale, divergence, codon & structure-guided modes

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-LG-01	**Aligning Very Large Sequence Sets** Approximate guide trees, chunking & memory control.	PRT/NBMS/LG/01	36 HOURS	06 DAYS	13,300
NBMS-LG-02	**Adding Sequences to an Existing Alignment** Anchored addition without disturbing curated columns.	PRT/NBMS/LG/02	24 HOURS	04 DAYS	8,700
NBMS-LG-03	**Divergent & Twilight-Zone Alignment** Profile seeding & iterative strategies for low identity.	PRT/NBMS/LG/03	32 HOURS	06 DAYS	11,800
NBMS-LG-04	**Codon-Aware & Translation-Guided Alignment** Protein-guided nucleotide alignment & frame integrity.	PRT/NBMS/LG/04	30 HOURS	05 DAYS	11,000
NBMS-LG-05	**Structure-Guided Multiple Alignment** Structural templates as alignment constraints.	PRT/NBMS/LG/05	34 HOURS	06 DAYS	12,600
NBMS-LG-06	**RNA Alignment with Structure Constraints** Secondary-structure-aware alignment of RNA families.	PRT/NBMS/LG/06	32 HOURS	06 DAYS	11,900

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 188 HOURS • 33 DAYS — ~~69,300~~ 58,900 INR

> Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

04

CATEGORY • NBMS-QC

Alignment Quality, Trimming & Curation

Metrics, reliability scoring, trimming & editing

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-QC-01	**Alignment Accuracy Metrics & Benchmarks** SP and TC scores against curated reference sets.	PRT/NBMS/QC/01	26 HOURS	05 DAYS	9,300
NBMS-QC-02	**Column Reliability & Confidence Scoring** Per-column and per-residue support estimation.	PRT/NBMS/QC/02	28 HOURS	05 DAYS	10,100
NBMS-QC-03	**Trimming & Block Selection Strategy** Gap and similarity thresholds & over-trimming risk.	PRT/NBMS/QC/03	24 HOURS	04 DAYS	8,700
NBMS-QC-04	**Manual Curation in Alignment Editors** Editor operation, anchoring & controlled hand edits.	PRT/NBMS/QC/04	22 HOURS	04 DAYS	7,800
NBMS-QC-05	**Detecting Misalignment & Frameshift Artefacts** Diagnostic patterns & corrective action.	PRT/NBMS/QC/05	26 HOURS	05 DAYS	9,400
NBMS-QC-06	**Documenting Curation for Reproducibility** Decision logs, versions & audit-ready records.	PRT/NBMS/QC/06	18 HOURS	03 DAYS	6,400

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 144 HOURS • 26 DAYS — ~~51,700~~ 43,900 INR

> Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

05

CATEGORY • NBMS-FM

Alignment Formats, Conversion & Handling

Formats, coordinates, concatenation & slicing

5 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-FM-01	**Alignment File Formats & Their Limits** FASTA, Clustal, Stockholm, Phylip & NEXUS.	PRT/NBMS/FM/01	16 HOURS	03 DAYS	5,600
NBMS-FM-02	**Format Conversion & Round-Trip Integrity** Lossy conversions, name truncation & validation.	PRT/NBMS/FM/02	18 HOURS	03 DAYS	6,300
NBMS-FM-03	**Aligned / Unaligned Coordinate Mapping** Column-to-residue mapping & index bookkeeping.	PRT/NBMS/FM/03	24 HOURS	04 DAYS	8,600
NBMS-FM-04	**Concatenation & Supermatrix Assembly** Partition files, missing data & matrix construction.	PRT/NBMS/FM/04	28 HOURS	05 DAYS	10,100
NBMS-FM-05	**Subsetting, Masking & Alignment Slicing** Region extraction, taxon subsets & masking rules.	PRT/NBMS/FM/05	20 HOURS	04 DAYS	7,100

STREAM BUNDLE • 5 MODULES • 5 PROTOCOLS • 106 HOURS • 19 DAYS

~~37,700~~ 32,000 INR

> Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

06

CATEGORY • NBMS-PF

Profile & Position-Specific Models

PSSMs, weighting, logos & profile HMM building

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-PF-01	**PSSM Construction from an Alignment** Frequency to score conversion & background models.	PRT/NBMS/PF/01	28 HOURS	05 DAYS	10,000
NBMS-PF-02	**Sequence Weighting & Pseudocount Schemes** Redundancy correction & small-sample handling.	PRT/NBMS/PF/02	26 HOURS	05 DAYS	9,400
NBMS-PF-03	**Information Content & Sequence Logos** Entropy-based column measures & logo construction.	PRT/NBMS/PF/03	22 HOURS	04 DAYS	7,900
NBMS-PF-04	**Profile HMM Architecture & States** Match, insert and delete states & transition structure.	PRT/NBMS/PF/04	34 HOURS	06 DAYS	12,500
NBMS-PF-05	**Model Building, Calibration & Validation** hmmbuild operation, calibration & model checking.	PRT/NBMS/PF/05	36 HOURS	06 DAYS	13,400
NBMS-PF-06	**Profile Comparison & Model Clustering** Model-versus-model comparison & family grouping.	PRT/NBMS/PF/06	32 HOURS	06 DAYS	11,900

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 178 HOURS • 32 DAYS — ~~65,100~~ 55,300 INR

Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

07

CATEGORY • NBMS-HM

HMM Search, Annotation & Family Assignment

Domain assignment, cutoffs & proteome annotation

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-HM-01	**hmmsearch & hmmscan Operation** Query/target orientation, output parsing & speed.	PRT/NBMS/HM/01	26 HOURS	05 DAYS	9,400
NBMS-HM-02	**Pfam Scanning & Domain Architecture** Domain calls, architecture strings & interpretation.	PRT/NBMS/HM/02	28 HOURS	05 DAYS	10,200
NBMS-HM-03	**Domain Boundaries, Envelopes & Clan Competition** Envelope versus alignment coordinates & overlap rules.	PRT/NBMS/HM/03	30 HOURS	05 DAYS	11,000
NBMS-HM-04	**Custom Family Model Creation & Curation** Seed selection, model building & iterative curation.	PRT/NBMS/HM/04	40 HOURS	07 DAYS	14,900
NBMS-HM-05	**Gathering, Trusted & Noise Cutoffs** Threshold setting & false-positive control.	PRT/NBMS/HM/05	22 HOURS	04 DAYS	8,000
NBMS-HM-06	**Proteome-Scale Batch HMM Annotation** Pipeline execution, parallelism & result assembly.	PRT/NBMS/HM/06	34 HOURS	06 DAYS	12,700

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 180 HOURS • 32 DAYS — ~~66,200~~ 56,300 INR

Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

08

CATEGORY • NBMS-CN

Conservation & Motif Discovery

Conservation scoring, motifs, covariation & mapping

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-CN-01	**Conservation Scoring Methods** Entropy, Jensen-Shannon & phylogeny-aware scores.	PRT/NBMS/CN/01	26 HOURS	05 DAYS	9,300
NBMS-CN-02	**Sequence Logo Generation & Interpretation** Logo construction, scaling & over-reading pitfalls.	PRT/NBMS/CN/02	20 HOURS	04 DAYS	7,100
NBMS-CN-03	**Motif Discovery from Unaligned Sets** De novo motif finding, model width & significance.	PRT/NBMS/CN/03	32 HOURS	06 DAYS	11,800
NBMS-CN-04	**Motif Scanning & Enrichment Testing** Scanning thresholds, background models & enrichment.	PRT/NBMS/CN/04	28 HOURS	05 DAYS	10,200
NBMS-CN-05	**Covariation & Coevolution Analysis** Correlated substitution signals & contact inference.	PRT/NBMS/CN/05	38 HOURS	07 DAYS	14,200
NBMS-CN-06	**Mapping Conservation onto Structure** Score-to-structure projection & site interpretation.	PRT/NBMS/CN/06	30 HOURS	05 DAYS	11,100

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 174 HOURS • 32 DAYS ~~63,700~~ 54,100 INR

Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

09

CATEGORY • NBMS-DS

Downstream Use of Alignments

Phylogeny, selection, variants & design inputs

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-DS-01	**Preparing Alignments for Phylogenetic Inference** Model-ready matrices, partitions & taxon sampling.	PRT/NBMS/DS/01	28 HOURS	05 DAYS	10,100
NBMS-DS-02	**Alignment Preparation for Selection Analysis** Codon alignment integrity for dN/dS workflows.	PRT/NBMS/DS/02	32 HOURS	06 DAYS	11,800
NBMS-DS-03	**Mapping Variants onto Alignment Columns** Position transfer, orthologous columns & annotation.	PRT/NBMS/DS/03	26 HOURS	05 DAYS	9,500
NBMS-DS-04	**Consensus & Ancestral Sequence Derivation** Consensus rules & ancestral reconstruction inputs.	PRT/NBMS/DS/04	30 HOURS	05 DAYS	11,000
NBMS-DS-05	**Primer & Probe Design from Conserved Blocks** Degenerate design from conserved alignment regions.	PRT/NBMS/DS/05	24 HOURS	04 DAYS	8,700
NBMS-DS-06	**Alignment-Based Feature & Annotation Transfer** Evidence-controlled transfer across a family.	PRT/NBMS/DS/06	26 HOURS	05 DAYS	9,400

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 166 HOURS • 30 DAYS — ~~60,500~~ 51,400 INR

Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

10

CATEGORY • NBMS-AU

Automation, Scripting & Visualisation

Scripted alignment, figures & reproducible reporting

6 MODULES

CODE	TRAINING MODULE	PROTOCOL REF	DURATION		FEE (INR)
NBMS-AU-01	**Biopython AlignIO & Alignment Objects** Reading, slicing & programmatic manipulation.	PRT/NBMS/AU/01	30 HOURS	05 DAYS	11,000
NBMS-AU-02	**R Alignment Workflows** Alignment objects, batch operations & plotting.	PRT/NBMS/AU/02	28 HOURS	05 DAYS	10,300
NBMS-AU-03	**Batch Alignment Pipelines & Job Control** Workflow scripting, restarts & resource control.	PRT/NBMS/AU/03	38 HOURS	07 DAYS	14,100
NBMS-AU-04	**Publication-Quality Alignment Figures** Annotated figures, colouring schemes & export.	PRT/NBMS/AU/04	26 HOURS	05 DAYS	9,500
NBMS-AU-05	**Interactive Viewers & Web Embedding** Browser-based alignment display & sharing.	PRT/NBMS/AU/05	24 HOURS	04 DAYS	8,700
NBMS-AU-06	**Reproducible Reporting & Version Pinning** Tool versions, parameters & re-runnable records.	PRT/NBMS/AU/06	20 HOURS	04 DAYS	7,200

STREAM BUNDLE • 6 MODULES • 6 PROTOCOLS • 166 HOURS • 30 DAYS — ~~60,800~~ 51,700 INR

> Each module is enrolled and certified independently against its own protocol reference, or taken together as the discounted stream bundle. Duration is the logged contact-hour allocation for that protocol; days are computed at six contact hours per working day. Fees exclude applicable GST.

ENROL • ALIGN • INTERPRET

Build a Career in Comparative Sequence Analysis

Every module in this catalogue is delivered as hands-on training on live sequence sets and working alignment installations, against a controlled protocol issued at the start and signed off at the end — covering alignment objective functions and guide trees, the standard and large-scale alignment tools, quality assessment, trimming and manual curation, format handling and supermatrix assembly, position-specific scoring matrices and profile hidden Markov models, family assignment and proteome-scale annotation, conservation and motif discovery, and the phylogenetic, selection and design analyses that alignments feed. Mix and match modules to design a track that fits your goals.

59	59	10	1606	03
TRAINING MODULES	CONTROLLED PROTOCOLS	CATEGORY STREAMS	CONTACT HOURS	OF THE NTHRYS BIOINFORMATICS SERIES

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