

A Modular Course on Introduction to Bioinformatics Tools  
**One week training in GENOMICS resources and methods**  
*(1st to 7th May 2010)*  
**(with demonstrations and hands-on sessions)**

[Click here](#) for a longer course (June 2010) on *genomics, transcriptomics and proteomics*

### Background:

The genome projects have triggered global changes in the research strategies and promised enhanced discovery rates in various life science subjects. The combination of genomic studies, related bioinformatics and the advanced technologies have positively influenced the rate of data capture in the area of genomic sequencing, gene prediction and systems biology, which in turn are influencing many aspects of today's research in almost every area of life science.

But the fundamental concepts, skills and advanced understandings of genomics and the related technologies have often eluded students as well as many of the professionals. IBAB and '[Shodhaka](#)' intend to bring a special opportunity for you to learn such special topics through this 1 week course.

### Contents:

The program particularly addresses the biotech-bioinfo interfaces and aims to build capacities required in genomics at the basic level. The theory topics include genome projects, genomic elements, gene and promoter prediction, primer/probe designing, comparative sequence analysis, SNP analysis, gene ontology etc. The hands-on sessions include both *in silico* exercises and case studies.

[Click here for a tentative list of lectures and hands-on sessions.](#)

### Participants:

This course is meant for beginners who intend to build the capacities required for genomics research and related job capacities. Pre-requisites: BSc, BTech or MSc students and graduates/post-graduates in life science/related subjects (e.g., biotechnology, agriculture, zoology, botany, bioinformatics, pharmacology, microbiology, biochemistry etc).

### Fees:

**Academic professionals** (researchers/teachers), **students or unemployed youth**: Rs.6000/-

**Other professionals**: Rs.12,000/-

Note:

1. Discounts may be available for select individuals with economic disadvantages.
2. The fees do not include food, accommodation and travel expenses. These costs will have to be borne by the participants separately. But, the organizers can assist you in finding accommodations in nearby locations.

To apply for the course, please send the DD ([payable to, SHODHAKA LIFE SCIENCES PVT. LTD., Bangalore](#)) to: Shodhaka, C/o IBAB, Biotech Park, Electronic city Phase I, Bengalooru 560 100, Karnataka State, India Ph: 80-6531 6565. Also please email your CV to [shodhaka@ibab.ac.in](mailto:shodhaka@ibab.ac.in). **Seats limited!**

*This module (2 credits) forms part of a series of modules (offered as part of the Centre of Excellence scheme under the DIT, Govt. India) and the credits can eventually be used to add up (over a maximum period of 3 years) to a certificate course or diploma in bioinformatics.*

All the course sessions will be conducted at IBAB ([click here for directions](#))

**Tentative schedule and contents:**

<b>DAY</b>	<b>Topic</b>
Preparation day* (1 <sup>st</sup> May -SAT)	Understanding life at cellular and molecular level
Day 1 (2 <sup>nd</sup> May -SUN)	Introduction genome and genomics
	DNA components, gene structures, other genomic elements, prediction resources and gene ontology
Day 2 (3 <sup>rd</sup> May)	Overview of uses of selected DNA/RNA bioinformatics resources for researchers: SRA, dbGSS, Popset, dbEST, Probe, RefSeq, CCDS, Unigene, FTP options, E-utilities, etc
	Overview of uses of selected DNA/RNA bioinformatics resources for biology researchers (part 2)
Day 3 (4 <sup>th</sup> May)	SNPs: An overview and online resources for SNP analysis
	Exercises in use of SNP resources
Day 4 (5 <sup>th</sup> May)	Sequence analysis basics
	Exercises in sequence analysis and gene ontology resources etc
Day 5 (6 <sup>th</sup> May)	Multiple sequence alignment algorithms – an overview; resources for MSA and their uses
	Resources for restriction site analysis, genome-wide repeats and primer/probe designing and their uses
Day 6 (7 <sup>th</sup> May)	DNA/RNA motif detection tools
	Promoter prediction programs and their use
Day 7 (8 <sup>th</sup> May)	Next-generation sequencing, submission of new sequences and other data and the future of genome sequencing
	Actual research examples of using bioinformatics tools

\*For selected candidates only!

A Modular Course Introduction to Bioinformatics Tools  
**One month training in resources and methods related to  
GENOMICS, TRANSCRIPTOMICS AND PROTEOMICS**  
**(1st to 30th June 2010)**  
(with demonstrations and hands-on sessions)

### Background:

The genome projects have triggered global changes in the research strategies and promised enhanced discovery rates in various life science subjects. The combination of genomics, transcriptomics, proteomics, related bioinformatics and the advancements in technologies have positively influenced the rate of data capture in the area of many aspects of today's research in almost every area of life science.

But the fundamental concepts and methodologies of genomics have often eluded students as well as many of the professionals. IBAB and '[Shodhaka](#)' present a highly flexible modular program to facilitate your training in these aspects in a month's time. The program particularly addresses the biotech-bioinfo interfaces and aims to build capacities required in genomics, transcriptomics and proteomics at the basic level. The participants can also choose to participate in selective sub-modules (genomics, transcriptomics, proteomics or selected combinations). The theory topics include genome projects, genomic elements, primer/probe designing, comparative sequence analysis, SNP analysis, gene ontology, gene expression technologies (microarray, 2-DE etc), and data analysis, resources for molecular interactions and pathway analysis etc. The hands-on sessions include both *in silico* exercises and case studies.

[Click here for tentative list of lectures and hands-on sessions \(and schedule\).](#)

### Participants:

This course is meant for beginners who intend to build the capacities required for research/jobs in advanced life science areas. *The number of participants is restricted to 15 only.*

**Pre-requisites:** BSc, BTech or M.Sc students and graduates/post-graduates in life science/related subjects (e.g., biotechnology, agriculture, zoology, botany, bioinformatics, pharmacology, microbiology, biochemistry etc).

*This module (4 credits) forms part of a series of modules (offered as part of the Centre of Excellence scheme under the DIT, Govt. India) and the credits can eventually be used to add up (over a maximum period of 3 years) to a certificate course or diploma in Bioinformatics.*

All the course sessions will be conducted at IBAB ([click here for directions to IBAB](#))

### Fees:

**Academic professionals** (researchers/teachers), **students or unemployed youth:** Rs.12,000/-

**Other professionals:** Rs.20,000/-

Note: The fees do not include food, accommodation and travel expenses. These costs will have to be borne by the participants separately. But, the organizers can assist you in finding accommodations in nearby locations.

*Note: Further discounts may be available, please write to us to inquire ([shodhaka@ibab.ac.in](mailto:shodhaka@ibab.ac.in)).*

*Also inquire for participation in selective sub-modules (genomics, transcriptomics and proteomics).*

To apply for the course, please send the DD (payable to, [SHODHAKA LIFE SCIENCES PVT. LTD., Bangalore](#)) to: Shodhaka, C/o IBAB, Biotech Park, Electronic city Phase I, Bengalooru 560 100, Karnataka State, India Ph: 80-6531 6565. Also please email your CV to [shodhaka@ibab.ac.in](mailto:shodhaka@ibab.ac.in). **Seats limited!**

Course Coordinator: Dr. Kshitish Acharya

Contact: [shodhaka@ibab.ac.in](mailto:shodhaka@ibab.ac.in)

**Tentative schedule and contents:**

DAY	Topic
Preparation day (1 <sup>st</sup> May)	Understanding life at cellular and molecular level + literature search
Day 1 (2 <sup>nd</sup> May)	Introduction genome and genomics
Day 2 (3 <sup>rd</sup> May)	DNA components, gene structures, other genomic elements, prediction resources and gene ontology
Day 3 (4 <sup>th</sup> May)	Overview of uses of selected DNA/RNA bioinformatics resources for researchers: SRA, dbGSS, Popset, dbEST, Probe, RefSeq, CCDS, Unigene, FTP options, E-utilities, etc
Day 4 (5 <sup>th</sup> May)	Overview of uses of selected DNA/RNA bioinformatics resources for biology researchers (part 2)
Day 5 (6 <sup>th</sup> May)	SNPs: An overview and online resources for SNP analysis
	Exercises in use of SNP resources
Day 6 (7 <sup>th</sup> May)	Sequence analysis basics
	Exercises in sequence analysis and gene ontology resources etc
Day 7 (8 <sup>th</sup> May)	Practice sessions in select areas
	Multiple sequence alignment algorithms – an overview; resources for MSA and their uses
Day 8 (9 <sup>th</sup> May)	Practice sessions in select areas
Day 9 (10 <sup>th</sup> May)	Resources for restriction site analysis, genome-wide repeats and primer/probe designing and their uses
Day 10 (11 <sup>h</sup> May)	DNA/RNA motif detection tools
Day 11 (12 <sup>th</sup> May)	Promoter prediction programs and their use
	Next-generation sequencing, submission of new sequences and other data and the future of genome sequencing
Day 12 (13 <sup>th</sup> May)	Practice sessions in select areas
Day 13 (14 <sup>th</sup> May)	Actual research examples of using bioinformatics tools
Day 14 (15 <sup>th</sup> May)	Transcriptomics: an overview and introduction to microarray technology
Day 15 (16 <sup>th</sup> May)	Types of GE datasets and introduction databases
	Demonstration and practice of microarray database use
Day 16 (17 <sup>th</sup> May)	Normalization, clustering methods used in microarray data analysis + introduction data processing
	Exercises in microarray data processing
Day 17 (18 <sup>th</sup> May)	Use primer designing programs for gene-expression studies – ExPrimer and oligo junction use
	Exercises in use of the software, resources for studying transcript variants and exon predictors
Day 18 (19 <sup>th</sup> May)	Comparative studies of Unigene, BioGPS, HPRD and other gene expression databases
Day 19 (20 <sup>th</sup> May)	Practice sessions
Day 20 (21 <sup>st</sup> May)	Real time PCR theory
Day 21 (22 <sup>nd</sup> May)	Proteomics overview
Day 22 (23 <sup>rd</sup> May)	2-DE expert talks
Day 23 (24 <sup>th</sup> May)	Protein-protein interaction studies
Day 24 (25 <sup>th</sup> May)	Pathway analysis studies and system biology
Day 25 to 29 (26 <sup>th</sup> to 30 <sup>th</sup> May)	Research paper presentations on advanced topics