

A Modular Course Introduction to Bioinformatics Tools  
**3-week training in resources and methods related to  
GENOMICS, TRANSCRIPTOMICS AND PROTEOMICS**  
**(7<sup>th</sup> to 30<sup>th</sup> June 2010)**

(with research paper presentations, demonstrations, hands-on sessions and case studies)

### 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 multiple areas of life sciences research today.

[Click here to know what participants felt about an earlier program](#)

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 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. There will be several hands-on sessions (*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. But seats are still available – since there is less time, please directly contact Dr. Acharya at 98 444 700 60 (between 9 am and 9 pm).*

**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 program (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. Participation certificates will be given for individual programs as well.*

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.6,000/-

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

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.

To apply for the course, please call us (number mentioned above) to confirm your registration, prepare a DD ([payable to, SHODHAKA LIFE SCIENCES PVT. LTD., Bangalore](#)), send a scanned copy to us by email & bring the original with you. The venue is, 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!**

## Tentative schedule and contents:

DAY	Topic
Preparation day (7 <sup>th</sup> June)	Understanding life at cellular and molecular level in the context of functional genomics
Day 1 (8 <sup>th</sup> June)	Consolidating the basics of genomics, systems biology and next generation sequencing principles and overview of important resources for genomics
Day 2 (9 <sup>th</sup> June)	DNA components, gene structures, other genomic elements, prediction resources and gene ontology resources
Day 3 (10 <sup>th</sup> June)	Next-generation sequencing, submission of new sequences and other data and the future of genome sequencing; overview of uses of selected DNA/RNA bioinformatics resources for biology researchers (e.g., SRA, CCDS, FTP options, E-utilities)
Day 4 (11 <sup>th</sup> June)	Resources for restriction site analysis, and primer/probe designing and their uses (mutagenesis, cloning, genetic engineering etc)
Day 5 (12 <sup>th</sup> June)	Mock exercises, assignments, advanced literature search methods and discussions.
SUNDAY	Assignments
Day 6 (14 <sup>th</sup> June)	Linking tools with research problems, sequence analysis basics and choosing among options; exercises in sequence analysis, gene ontology resources etc
Day 7 (15 <sup>th</sup> June)	Sequence analysis from genomics perspectives: an overview; resources for MSA (other than clustalW) and their uses, literature and research problems; exercises
Day 9 (16 <sup>th</sup> June)	SNPs: An overview and online resources for SNP analysis and exercises in use of SNP resources
Day 10 (17 <sup>th</sup> June)	DNA/RNA motif detection tools; exercises with case studies
Day 11 (18 <sup>th</sup> June)	Transcriptomics: an overview and introduction to microarray technology; comparison to other modern gene expression profiling methods (SAGE, MPSS, etc); research examples of using bioinformatics tools
Day 12 (19 <sup>th</sup> June)	Normalization, clustering methods used in microarray data analysis + introduction data processing
SUNDAY	Assignments
Day 13 (21 <sup>st</sup> June)	Types of GE datasets and introduction databases; Demonstration and practice of microarray database use; exercises in microarray data processing
Day 14 (22 <sup>nd</sup> June)	Exercises in use of the various software studied so far
Day 15 (23 <sup>rd</sup> June)	Real time PCR theory and proteomics overview
Day 16 (24 <sup>th</sup> June)	Protein-protein interaction studies
Day 17 (25 <sup>th</sup> June)	Pathway analysis studies and system biology
Day 18 (26 <sup>th</sup> June)	Comparative studies of Unigene, BioGPS, HPRD and other gene expression databases
SUNDAY	Assignments
Day 21 to 24 (27 <sup>th</sup> till 30 <sup>th</sup> June)	Advanced research paper presentations and practical sessions with case studies

**Course Coordinator:** Dr. Kshitish Acharya

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