Master of Science in Bioinformatics

Post Graduate Diploma in Bioinformatics (PGDBI)

(Revised - Fall 2007)

Bioinformatics often interchangeably used with Computational Biology is an integrated subject encompassing applied mathematics, informatics, statistics, computer science, artificial intelligence, chemistry and biochemistry to solve biological problems usually at the molecular level. Bioinformatics is directed towards the study of sequence alignment, gene finding, genome assembly, protein structure alignment, protein structure prediction, prediction of gene expression and protein-protein interactions, and the phylogenetic modeling and evolutionary relationships. With its unparalleled strength in the area of Information Technology, India is on the brink of a major revolution in the area of Biotechnology. And Bioinformatics is one of the emerging areas where there is a great potential for career opportunities.

The I semester of the course relates to subjects required for an in depth knowledge of Cell Biology, Genetics, Immunology, Biochemistry and Molecular Biology. II and III semester subjects concentrate on computer programming aspects and include languages such as PERL, Python, HTML , XML. C++ and JAVA. Besides an introduction to the study of biological databases, the study of entire genome of the organisms-the Genomics and the large scale study of structure and functions of proteins-the Proteomics are included in the III semester. .The last semester subjects are application oriented and related to Drug Design and Gene Therapy and Data warehousing and Data Mining. At the end of the each even semester the students have to complete a project work.

Objectives: The course aims at realizing the following objectives-

- To provide to students with requisite knowledge to pursue a career in Bioinformatics either in academics or in industry
- To Impart in-depth training in theoretical and practical aspects of applications of Information Technology to solve problems in Biology.
- To enable the students to acquire an integrated outlook of the subject so that they could become potential researchers in the fields of Biotechnology and Bioinformatics.

Eligibility: MSc / BSc in Life Science (like Chemistry/Botany/ Zoology) / BE / PG (with specialization like Molecular Biology / Biochemistry / Genetics / Microbiology / Structural Biology / Neurosciences / Pharmaceutical Sciences / Veterinary Sciences/ Food Sciences / Agricultural Sciences / Biotechnology / Physics / Chemistry / Mathematics / Statistics) / MBBS / BDS / M Pharma / B Pharma / IT professionals with a background in specialized tools and database programs.

Course Fee: Rs.16,450/- per semester inclusive of examination fees or as revised from time to time.

Min. duration: 1 year (2 semesters) {for PGDBI}; 2 years (4 semesters) {for MScBI}.

Max. duration: 2 years {for PGDBI}; 4 years {for MScBI}.

Minimum Counseling and hands-on experience at Learning Centers: 160 hrs/semester.

Evaluation: Please refer Page No. 8, Para B

The MSc BI students will have to carry out a compulsory project as a part of the curriculum in 2nd and 4th semester to fulfill the requirement of the course. These projects could be done in any area of bioinformatics like data mining, sequence analysis, structure prediction, phylogenetics analysis etc. In order to perform these tasks, students have to use software packages like BIOEDIT, EMBOSS, JEMBOSS, STADEN etc. The software along with a demonstration CD will be provided by the University. Every student of MSc. BI will buy the CD from the University through the Learning Center by paying a fee of Rs.310/- (Rs.250 for software CD + Rs.60 for the demonstration CD) in the form of a Demand Draft drawn in favour of Sikkim Manipal University DE payable at Manipal.

MScBI

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Course Structure

Semester I

Code	Title	Credits
BI0024	Cell Biology & Genetics	4
BI0025	Immunology	2
BI0026	Biochemistry	4
BI0027	Linux	2
BI0028	Mathematics & Statistics	4
Total Credits		16

Semester II

Code	Title	Credits
BI0029	Molecular Biology	4
BI0030	Biological databases & Sequence Analysis	2
BI0031	Programming for Bioinformatics I (PERL)	4
BI0032	Programming for Bioinformatics II (Python, HTML, XML)	2
BI0033	Project	4
Total Credits		32

Semester III

Code	Title	Credits
BI0034	Genomics	4
BI0035	Proteomics	2
BI0036	Programming for Bioinformatics III (C Programming)	4
BI0037	Programming for Bioinformatics IV (JAVA Programming)	2
BI0038	Database Management Systems	4
Total Credits		48

Semester IV

Code	Title	Credits
BI0039	Drug Design & Discovery	4
BI0040	Algorithms in Bioinformatics	4
BI0041	Data Ware Housing and Data Mining	4
BI0042	Project	4
Total Credits		64