Department of Bioinformatics
School of Earth, Biological and Environmental Sciences
Central University of South Bihar
Syllabus of M.Sc. Bioinformatics
Session-2018 onwards

Introduction

Bioinformatics is a rapidly growing field of interdisciplinary study at the interface of biology and Information technology. As such, Bioinformatics brings together Molecular biology with areas from Statistics, Mathematics, and Computer science. Bioinformatics now entails the creation and advancement of databases, algorithms, computational and statistical techniques, and theory to solve formal and practical problems arising from the management and analysis of biological data. Considering the interdisciplinary nature of Bioinformatics, this master programme shall have a major component from related subjects under one umbrella.

Objectives

The core objective of the programme is to provide quality education to the graduates, who want to pursue their career in the emerging areas of Bioinformatics and Computational Biology.

- To serve as a nodal point for Bioinformatics and its applications
- To provide industry interface to the students for research project
- To build skilled manpower for drug design and pharmaceutical industry

Target Group and Eligibility

Bachelor degree in Biological Science/ Agricultural Science/ Pharmaceutical Science/ Veterinary Science/ Medical Science/ Mathematics/ Physics/ Chemistry/ Computer Science/ Information Technology or any other related discipline.

Duration: Two Years (Four Semester) – Full Time

Course Structure of M.Sc. Bioinformatics
Total Credits: 96

Semester I **(24 Credits)**

Course Code	Course title	Credits		
Core Courses		L	T	P
MSBIS1001C04	Introduction to Bioinformatics	2	1	1
MSBIS1002C04	Cell and Molecular Biology	3	1	0
MSBIS1003C04	Mathematics and Statistics with R	2	1	1
MSBIS1004C04	Linux and Shell Programming	2	1	1
MSBIS1005C04	Programming with C	2	1	1
	One elective course of 4 credits from parent or other department			
MSBIS1006S00	Plantation of Trees	Non- credit		

Student may choose any related course/elective including wet laboratory practicals during semester I and II from other department.

Semester II **(24 Credits)**

Course Code	Course title	Credits		
Core Courses		L	T	P
MSBIS2001C04	Algorithms in Bioinformatics	3	0	1
MSBIS2002C04	Biomolecular Modelling & Simulations	3	0	1
MSBIS2003C04	Programming with Perl	2	1	1
MSBIS2004C04	Genetics and Genomics	3	1	0
MSBIS2005C04	Evolution and Molecular Phylogeny	3	1	0
	One elective course of 4 credits from parent or other department			
MSBIS2006S00	Swachh Bharat Abhiyan	Non- credit		

Students wish to go for summer training (non-credit) may join the same at the end of II semester and present work done during summer training within one week of the commencement of semester III.
Experts from industry / alumni placed at various institutions may be called for guest lecture and interaction to get update on requirement in industry.
Educational/Industrial tour or Excursion may be made to visit institutes/industries/laboratories based on availability of funds or otherwise. If excursion took place, student has to submit a report (10 marks) within a week that will be the part of continuous assessment of a specific course decided by faculty council.

Semester III **(24 Credits)**

Course Code	Course title	Credits		
Core Courses		L	T	P
MSBIS3001C04	Chemoinformatics and Drug Design	3	0	1
MSBIS3002C04	Transcriptomics and Proteomics	3	0	1
MSBIS3003C04	DBMS and Web Technology	2	1	1
MSBIS3004C04	Minor Project (Review of Literature, Seminar, and Research Problem Definition)	4		
	Two elective courses of 8 credits from parent or other department			
MSBIS3005S00	Village based Skills	Non- credit		
MSBIS3006S00	Human Molecules Genetics (SWAYAM Course)	Non- credit		

Semester IV **(24 Credits)**

Course Code	Course title	Credits
MSBIS4001C24	Dissertation	24

Student would have choice to carry out dissertation internally or externally.

Course Code	Course title	Credits		
Elective Courses		L	T	P
MSBIS1001E04	Biochemistry and Immunology	3	1	0
MSBIS2001E04	Whole exome sequencing data analysis	3	0	1
MSBIS3001E04	Big Data Analytics and Health Informatics	4	0	0
MSBIS3002E04	Programming with Python	2	1	1
MSBIS3003E04	Systems Biology	2	1	1

C: Core Course; E: Elective Course; S: Self-study/Skill Course
An elective will run if opted by 33% of the students enrolled in the programme.

Inter department elective: Any theory course and related practical may be opted by a student from school
Inter school course: MSBIS1004C04, MSBIS1005C04, MSBIS3003C04
Skill based course: MSBIS1001C04, MSBIS1005C04, MSBIS2002C04, MSBIS2003C04, MSBIS3001C04, MSBIS3003C04