DR. HOMI BHABHA STATE UNIVERSITY

ELPHINSTONE COLLEGE

M.Sc. -BIOINFORMATICS

2022-2023

Proposed by:	Department of Microbiology.,Elphinstone College
Course level	Postgraduate
Duration:	2 years
Course name:	M.Sc. BIOINFORMATICS
Proposed start date:	AUGUST 2022
Proposed strength:	20
No. of Batches :	01
Eligibility for admission:	• Bachelors in any Life sciences (Botany, Biochemistry, Biotechnology, Environmental science, Life science, Microbiology, Statistics, Zoology, Pharmacy, Veterinary Science) • Chemistry (if the student has opted for any one biological science in the second year of graduation)
Method of Selection:	Entrance test / Merit-based and counseling

BACKGROUND

Dr. Homi Bhabha State University the first Cluster University of Maharashtra State, established in February 2019 under Rashtriya, Ucchatar Shiksha Abhiyan (RUSA) is broadening its horizon by introducing career-oriented academic programs.

Elphinstone College, Department of Microbiology, committed to student-centric development and quality education, has initiated a two-year master's program in BIOINFORMATICS a scientific discipline and asset of skills that has now become one of the most important information gathering, data mining, and knowledge-building tools in recent current research and clinical applications. Currently, it is the most sorted interface between two rapidly advancing fields of biological and computational science.

HIGH LIGHTS OF THE COURSE

Bioinformatics has a broad range of applications in molecular biology, pharmacology, biotechnology, forensic science, drug designing, and various other disciplines. The availability of unprecedented measuring tools and computational power has managed to address several unresolved questions in the biological and biomedical sciences and is continuing to empower clinical practice in fundamental ways. Currently with medical field is witnessing a surge in rapid molecular and genomic analysis requiring large data mining, text and language processing, privacy, clinical decision support, etc., in the field of Biomedicine.

SCOPE

Apart from getting a job in the IT sector, candidates with the right skill set and knowledge can apply to pharmaceutical companies, biomedical organizations, biotechnology research institutions, as well as agricultural companies. Highly remunerative career prospect Bioinformatics is seen on the rise in the following sectors

- Bio-analytics, Computational chemist, Clinical pharmacologist, Pharma industry - Pharmacology & Pharmacogenomics
- Database design and maintenance
- Research- Genomic studies Sequence assembly & Sequence analysis
- Informatics developer pharmaceutical, biomedical organizations & Biotech companies,
- Health care industry, hospitals, Academics

CAREER & JOB PROSPECTS

Job prospects for Bioinformaticians apply to a variety of sectors

- ✓ Bioinformatics Software Developer, Computational Biologist
- ✓ Research Scientist
- ✓ Associate Network, Administrator / Analyst,
- ✓ Database Programmer
- ✓ Content Editor

CURRICULUM DESIGN

The curriculum of M.Sc. Bioinformatics is designed considering the need and expectations of various stakeholders, feedback, and consultation with academicians, research associates & industry experts, and scholars from relevant fields. The course is structured to give students career options in various fields including academic work in a diversity of graduate and professional programs as

per UGC guidelines. The teaching and learning methods would incorporate contact classes, online and offline methods with Hands-on training provided for practical orientation. Students will be given independent project work to stimulate problem analysis, Case studies, and paper review to understand -techniques for resolving the problem and probable solutions to the same. The program aims in providing opportunities to apply theoretical knowledge to real-time problems in organizations.

PROGRAM OUTCOME

Upon completion of the program, the student will be well equipped and competent with the characteristic Knowledge-bank, and Skill-set, in the chosen field.

- Better understanding of the intersection of life and information sciences, origins of biological data, as well as how to manipulate them and determine their quality.
- Bridge the gap between data science and biomedicines with the help of bioinformatics.
- On getting hands-on experience will be able to apply the latest computational tools and methods for the development of new drugs and diagnostic tools.
- Develop new bioinformatics tools/software using various languages like C++, Perl, Python, Java, MongoDB, Android, AI, etc.
- Understand & relate the language of structure-function relationships, information theory, gene expression, and database queries

PROGRAM-SPECIFIC OUTCOME

- As the learners are given an option of **elective** courses are designed to enhance the overall development of the student & make them competent to handle real-time situations
- The program is designed with a focus on an **independent research project** in semesters III & IV for which the learners are taught the necessary skills &which will enable them to design & execute the project more effectively
- Elective courses like Clinical data management, critical review of scientific papers, IPR, and Bio-entrepreneurship are courses that are offered which will give an edge **over the other programs run for the same subject by other universities**

ELIGIBILITY

Bachelor's degree from a recognized university in any of the following disciplines:

- Science (Agriculture, Biochemistry, Biology, Botany, Biotechnology, Life Sciences Environmental Science, Microbiology, Pharmacy, Zoology, Medicine, Pharmacy, Veterinary Science.

- For major in Chemistry, Physics, or Statistics (if the student has opted for any one biological science up to the second year of graduation)

COURSES & EVALUATION

University semester-end examination evaluated for 50/100/150 /200 depending on the credit allotment for each course

- Internal Assessment: 40 % (theory test, seminars, assignments)
- Independent Project work: 400 marks
- Summer training: 100 marks under SEC proposed on approval

SEMESTER	COURSE	CREDIT
SEMESTER I **28 credits**	CC101- Fundamentals of Biology	4
	CC102- Introduction to Bioinformatics & Sequence analysis	4
	CC103-Computational Methods in Biology	4
	IE101-Programming Language	4
	GE101-Mathematics & Statistics OR Basic Biology	2
	AE101-Bioethics & Biosafety OR Bio-Entrepreneurship & Management	2
	Lab work	8
SEMESTER II **28 credits**	CC201-Advanced Biology	4
	CC202-Biology of Diseases	4
	CC203 -Separation techniques	4
	IE201-Programming Language	4
	SE201-Application of Bioinformatics	4
	LAB WORK	8
SEMESTER III **28 credits**	CC301-Molecular Modelling drug designing	4
	CC302-Proteomics and Genomics	4
	DE 301-Programming Language	4
	DE302-Introduction to PHP and SQL	4
	GE301-Clinical Research and Clinical Data Management *OR* Molecular statistical model using -R	2
	AE301-Research Methodology and Scientific Writing	2
	DISSERTATION-I Project Presentation	8
SEMESTER IV **28 credits**	CC401-Cheminformatics & Drug Designing	4
	CC402-Immunology and Immunoinformatic	4
	DE401-Python, Bio Python	4
	DE 402-IPR & Pat informatics	4
	SE401-Scientific paper review (02 papers)	4
	DISSERTATION-II-Project Presentation	8
		112
Non-CGPA, MOOC, and/or Courses/Extra can be opted for by students in the semester I &II		

COURSE STRUCTURE

SEM	Core Courses Credits: 4	DE/ IE Credits: 4	GE Credits:2	AE- Credits:2	SE- Credits: 4	Lab/Projects	Total Credits
I	CC101 CC102 CC103-	IE101	#GE101	AE101	-----	2 Credits * 4 Lab = 8 Credits LB1=50 Marks LB2=50 Marks LB3=50 Marks LB4=50 Marks Total 200 marks 8 credits	CC:4*3=12 IE:4*1 =4 AE: 4*1=4 Lab = 8 Total = 28
II	CC201- CC202- CC203	IE201	------	-------	SE201	2 Credits * 4 Lab = 8 Credits LB1=50 Marks LB2=50 Marks LB3=50 Marks LB3=50 Marks Total 200 marks 8 credits	CC: 4*3=12 IE: 4*1=4 SE:4*1=4 Lab = 8 Total = 28
III	CC301 CC302	DE301 DE302	##GE301	AE301	--------	Dissertation-I Project (200 Marks) 8 credits	CC: 4*2=8 DE: 4*2=8 GE: 2*1=2 AE: 2*1=2 Project-1 = 8 **Total = 28**
IV	CC401- CC402	DE401 DE402	---------	---------	SE401	Dissertation-II Project (200 Marks) 8 credits	CC: 4*2=8 DE: 4*2=8 SE: 4*1=4 Projects = 8 **Total = 28**
						Course Credit = 112	

Non- CGPA -MOOCs and/or Courses/Extra can opt for the semester I /II

FEE STRUCTURE:

Sr. No.	Fee Heads	Open category	Reserved category (SC/ST)
A	**OTHER FEES**		
1	College & Library I - cards	100	100
2	Library Fee	500	0
3	Gymkhana / Extra-Curricular Fee	500	0
4	Computer Lab Fee	500	125
5	Internet Fee	500	250
6	Utility Fee	250	0
7	College Development Fee	500	0
8*	*Application Prospectus/Form Fee*	**50**	**50**
9*	*Application online charges - PG*	**400**	**400**
10	Project Fee (PG)	**0**	**0**
11	Vice Chancellor's Fund	50	50
12	Students Welfare Fund	50	50
13	Ashwamedh Fees	50	50
14	Disaster Relief Fund	20	20
15	University Sports / Cultural Fee	50	0
16	Student Group InsuranceFee	100	100
17	Magazine / Souvenir Fee	150	0
18	Alumni Association Fee	100	100
19	Eligibility fee - Indian Students	500	250
	Total of other Fees	**4370**	**1545**
B	**DEPOSITS**		
1.	Caution Money	1,000	0
2.	Laboratory Deposit	1000	0
3.	Library Deposit	500	0
4.	Computer Lab Deposit	1000	0
	Total	**3,500**	**0**
C	**TUITION FEES**		
	Tuition fee	**65000**	**0**
	Grand Total(A+B+C)	**72,870**	**1,545**

EXAMINATION-RELATED FEES AS PER THE TABLE BELOW:

Sr. No.	Fee per Semester end Examination	Fees Rs.		Every Year at the time of the Examination
		Open	Reserved	
1.	PG Exam. Fees per Semester (All Subjects)	3,500	3,500	
2.	PG Exam. Fees per Semester (per Subject)	500	500	
	Fees as per requirement	**Open**	**Reserved**	**Remarks**
5	Photocopy Fees Per Answer Book	250	150	
6	Revolution Fees Per Answer Book	800	500	
7	Convocation Fees	1000	1000	
8	Degree Certificate Verification Fees	500	300	
9	Marksheet Verification Fees	500	300	
10	Duplicate Marksheet Fees	500	300	**As applicable**
11	Duplicate Degree Certificate Fees	700	500	
12	Bonafide Certificate Fee	300	200	
13	Transcript Fees per University	1,500	1,500	
14	Attestation Fees per University	1,000	1,000	
15	Migration certificate fee	1,000	1,000	

Deposits (refundable)

Sr No.	Fee heading	Fee as Proposed
1.	Caution Money	1000
2.	Laboratory Deposit	1000
3.	Library Deposit	500
4.	Computer Lab Deposit	1000