

ADMISSION & EXAMINATION BYE-LAWS

FOR

MASTER OF SCIENCE

**Computational & System Biology and Bioinformatics
M.Sc(CSB)**

***CHOICE BASED CREDIT SYSTEM (CBCS)
(W.E.F. 2021-22)***



**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
School of Engineering Sciences & Technology
JAMIA HAMDARD
(DEEMED TO BE UNIVERSITY)
Hamdard Nagar, New Delhi-110 062
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PROGRAM OUTCOME

PO1: Communication Skills: The students will be able to demonstrate English language proficiency to perform effectively in the professional and personal life by being able to comprehend and write effectively and efficiently.

PO2: Domain knowledge: The students will be able to understand the theoretical foundations and the limits of computing in Bioinformatics.

PO3: Technical skills: The students will be to design, develop and evaluate new computer based systems for novel applications which meet the desired needs of industry and society.

PO4: Knowledge inter-disciplinary in nature: The students will be exposed to acquires sufficient knowledge of the interdisciplinary subjects and use them in developing advanced computing techniques and tools in the field of biology.

PO5: Positive attitude: The students will be able to inculcate a positive attitude through various courses.

PO6: Critical thinking and problem-solving skills: The students will be able to apply the fundamentals of computer science in various biological related problems to come up with feasible solutions.

PO7: Dynamism and team building skills: The students will be able to develop required skills to work efficiently on multidisciplinary projects and teams to accomplish a common goal.

PO8: Professional ethics and social values: The students will develop an understanding of work ethics and will have the ability to carry out any task with professional ethics and without deviating from social values

PO9: Self-awareness and emotional intelligence: The students will identify their strengths and talents and learn to establish a balance at the time of crisis.

PO10: Entrepreneurship and Innovative qualities: The students will acquire entrepreneurship and innovative qualities through various learning programs.

PO11: Responsibility towards society and environment: The students will realize their social responsibilities. The students are expected to learn tools and techniques for designing and integrating technology-based solutions for real world problems and drive scientific and societal advancement through technological innovation.

PO12: Lifelong learning: The students are expected to engage in lifelong learning for the advancement of technology and its adaptation in multi-disciplinary environments.

ADMISSION & EXAMINATION RULES
for
MASTER OF SCIENCE
Computational & System Biology and Bioinformatics

M.Sc(CSB) offered by the Department of Computer Science & Engineering and coordinated by BIF centre.

1. PROGRAM OBJECTIVE

To prepare highly skilled professionals with a strong conceptual, theoretical & practical proficiency and research ability in the field of Computer Science & Engineering and related emerging areas; such as Data Sciences, Big Data Analytics, Healthcare and Bioinformatics

2. THE PROGRAM

Highlights of the program are described in the following table:

a.	<i>Name of the Program</i>	M. Sc (CSB)
b.	<i>Nature</i>	Regular and Full Time
c.	<i>Duration</i>	Two Years (4 Semesters)
d.	<i>Total number of credits</i>	96
e.	<i>Medium of Instruction and English Examinations</i>	English
f.	<i>Eligibility Criteria</i>	A minimum of 55% marks in Bachelor's degree program in bioinformatics, or any branch of basic/applied Sciences or Technology, including Life Sciences, Medicine, Pharmacy, Engineering and Computer Science and allied disciplines.
g.	<i>Selection procedure</i>	As per the merit of the qualifying examination
h.	<i>Total Seats</i>	6-8 in each program; inclusive of seats reserved for NRI / sponsored candidates; additional seats are available for Foreign Nationals.
i.	<i>Period of Completion</i>	Not more than 04 years (8 Semesters)
j.	<i>Commencement of the Program</i>	July of the every academic session

3. COURSE STRUCTURE

1st semester

Course Code	Course Title	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
MCSB (CC) 101(T)	Introduction of Bioinformatics, Biological Data & Databases	SB	25	75	100	3-1-0	4
MCSB (CC) 102 (T)	Biology for Bioinformatics	BS	25	75	100	3-1-0	4
MCSB (CC) 103 (T)	Fundamentals of computing	BS	25	75	100	3-1-0	4
MCSB (CC) 104 (T)	Essential Mathematics & Biostatistics	BS	25	75	100	3-1-0	4
MCSB (CC) 105 (T)	Programming in Perl	CS	25	75	100	2-0-0	2
MCSB (GE) 106 (T)	Generic Elective 1	PE	25	75	100	2-0-0	2
MCSB 107 (P)	Lab -1 based in MCSB 101	LAB	25	75	100	0-0-2	2
MCSB 108 (P)	Lab -2 Perl lab	LAB	25	75	100	0-0-2	2
Total					800	16-4-4	24

2nd Semester

Course Code	Course Title	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
MCSB (CC) 201 (T)	Structural Bioinformatics & drug Design	SB	25	75	100	3-1-0	4
MCSB (CC) 202 (T)	Designing algorithms for Bioinformatics	CS	25	75	100	3-1-0	4
MCSB (CC) 203 (T)	Database Management System	CS	25	75	100	3-1-0	4
MCSB (CC) 204 (T)	Predictive Modelling and Analytics	CS	25	75	100	3-1-0	4
MCSB (CC) 205 (T)	Chemoinformatics ,Chemogenomics and Immunoinformatics.	SB	25	75	100	2-0-0	2
MCSB (GE) 206 (T)	Generic Elective 2	PE	25	75	100	2-0-0	2
MCSB (CC) 207 (P)	Lab 3 System Biology lab	LAB	25	75	100	0-0-2	2
MCSB (CC) 208 (P)	Lab 4 DBMS lab	LAB	25	75	100	0-0-2	2
Total					800	16-4-4	24

3rd Semester

Course Code	Course Title	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
MCSB 301(CC) (T)	NGS Data analysis – Microarray, RNA Seq, Single Cell sequencing	SB	25	75	100	3-1-0	4
MCSB 302 (CC) (T)	Programming in R and Python	CS	25	75	100	3-1-0	4
MCSB 303 (CC) (T)	Data Warehousing and Data Mining	CS	25	75	100	3-1-0	4
MCSB 304 (CC) (T)	Data Modelling and Visualization	CS	25	75	100	2-0-0	2
MCSB 305 (GE) (T)	Generic Elective -3	PE	25	75	100	2-0-0	2
MCSB (CC) 306 (P)	Minor project	PROJ	25	75	100	0-04	4
MCSB 307 (CC) (P)	Lab 5 R and Python Lab	LAB	25	75	100	0-0-2	2
MCSB (308 CC) (P)	Lab 6 NGS lab	LAB	25	75	100	0-0-2	2
Total					800	13-3-8	24

4th Semester

Course Code	Course Title	Course Type	Marks			L-T-P	Credits
			Internal Assessment	Semester Exam	Total		
MCSB 401 (CC) (P)	Project/ Dissertation@ #	DISS	300	200	500	0-0-40	20
MCSB 402 (CC) (P)	Seminar	SEM	25	75	100	0-0-8	4
Total						0-0-48	24

GENERIC ELECTIVE (GE)

Course Code	Course Title	Marks			L-T-P	Credits
		Internal Assessment	Semester Exam	Total		
Generic Elective 1 MCSB (GE) 106 (T)						
	Biomolecules	25	75	100	2-0-0	2
	Bioinformatics tools and development	25	75	100	2-0-0	2
	Advance Bioinformatics Applications	25	75	100	2-0-0	2
Generic Elective – 2 MCSB (GE) 206 (T)						
	Research Methodology	25	75	100	2-0-0	2
	Programming in Java	25	75	100	2-0-0	2
	Intellectual Property Rights	25	75	100	2-0-0	2
	Comparative and Functional Genomics	25	75	100	2-0-0	2

Generic Elective – 3 MCSB (GE) 305 (T)						
	Evolutionary bioinformatics	25	75	100	2-0-0	2
	Proteomics & Metabolomics	25	75	100	2-0-0	2
	Artificial Intelligence and Machine Learning in Bioinformatics	25	75	100	2-0-0	2

@ Dissertation/Mini Project shall be based on latest research topics in the field of Bioinformatics, Computer Sciences.

Students are required to get approval of their title of Dissertation/Mini Project by Dissertation Assessment & Evaluation committee constituted by HOD. Supervisor of respective students must be member of the above committee. Students are required to give at least three presentations/seminars for progress monitoring & assessment purpose to their respective supervisors. Viva-voce will be held only after the submission of completion report duly signed by the supervisor of the respective student. A plagiarism report duly signed by the students are mandatory to submit in compliance with UGC (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulations, 2017 (or any such regulations notified time to time) by competent authority.

EXAMINATION RULES

4. MODE OF CURRICULUM DELIVERY

Mode of curriculum delivery includes classroom teaching, assignments, test, lab work, presentations, participation in relevant events and regularity.

5. ATTENDANCE

- a. All students are supposed to attend every lecture and practical classes. However, the attendance requirement for appearing in the examination shall be a minimum of 75% of the classes held.
- b. Each one-period teaching shall account for one attendance unit.
- c. The concerned teacher will take a roll call in every scheduled class, maintains and consolidate the attendance record, which would be submitted to the Head of the Department at the conclusion of the semester.
- d. Attendance on account of participation (with prior permission from the Head of the Department) in the co-curricular/extra-curricular activities can be granted by

- the Dean on receipt of certificates or recommendations of the respective activity issued by the Head of the Department.
- e. Attendance records displayed on the Notice Board from time to time, in respect of short attendance, shall be deemed to be a proper notification and no individual notice shall be sent to the students/local guardian.
 - f. In case a student is found to be continuously absent from the classes without information for a period of 30 days, the concerned teacher shall report it to the Head of the Department.
 - g. Head of the Department may recommend for striking off the name of a student from rolls, after ensuring 'one month continuous absence', from all the concerned teachers.
 - h. A student, whose name has been struck off on account of long absence may apply to the Dean for readmission within 15 days of the notice of striking off the name. The readmission shall be effected on payments of prescribed readmission fees.
 - i. A student with less than 75% attendance in a subject shall not be allowed to appear in that subject in the semester examination. The Head of the Department shall recommend all such cases to the Dean of the School.
 - j. The Dean, on the recommendation of the Head of the Department, may consider the relaxation of attendance up to 10% on account of sickness and /or any other valid reason. No application for relaxation of attendance (duly certified by a Registered Medical Practitioner/Public hospital or a competent authority) will be entertained after 15 days from the recovery from illness etc.

6. INTERNAL ASSESSMENT

- a. Internal assessment, to be made by concerned teachers, will be based on minor tests, quizzes, presentation, programming test, demonstrations and assignments.
- b. There will be three (3) Internal Assessment (Unit Tests) with a total of 20 marks ,and the best two (2) performances out of the three Unit tests of Internal Assessment will be counted. Other modes of assessment shall account for remaining 5 marks.
- c. Dates for unit test will be announced at the beginning of the semester, by the examination coordinator.
- d. The teacher concerned shall maintain a regular record of the marks obtained by students in unit tests and display the same in due course.
- e. The concerned teachers shall submit the compiled internal assessment marks to the Head of the Department, on the conclusion of teaching of the current semester.
- f. The Head shall display a copy of the compiled sheet, of internal assessment marks of all the papers, before forwarding it to the Controller of Examination, i.e. at the conclusion of the semester.

- g. A promoted candidate, who has to reappear in the examination of a paper, will retain internal assessment marks.
- h. In the case of re-admission, the candidates shall have to go through the internal assessment process afresh and shall retain nothing of the previous year.

7. SEMESTER EXAMINATIONS

Prescriptions for conducting semester examinations of theory and lab papers, those shall be conducted after the conclusion of each of the semesters, are presented in the following table:

S.N.	Classification	Theory	Lab
1.	Mode	Written Only	Written, Demo, Programming and viva- voce etc.
2.	Duration	03 Hours	04 Hours
3.	Total Marks	75 (Seventy Five Only)	75 (Seventy Five Only)

8. DISSERTATION/INDUSTRIAL PROJECT

- a. Each student of the final semester will have to go for a Dissertation/Industrial Project work either in the industry or in the Department under the guidance of one or two faculty members.
- b. Period of completion of Dissertation/Industrial Project work shall be full one semester.
- c. There shall normally be two supervisors-one internal and one *external (in the case of industry project form the place where the student is pursuing project-work)*.
- d. All the students, who are pursuing the Dissertation/Industrial project work, shall be continuously in touch with the internal supervisor.
- e. **There shall be a mid-term evaluation of the progress** and the internal supervisors will conduct it. However, an internal supervisor may ask the student to submit a confidential progress-report from the external supervisor (*in the case of industry project*).
- f. All the candidates shall submit **Three (03)** hard copies of the project reports that are duly approved and signed by internal as well as external (*if applicable*) supervisors.

- g. An external examiner, appointed for the purpose, shall evaluate the project report.
- h. The Head of the Department shall fix a date and time for viva-voce examinations, on receipt of the evaluation-report of the project reports from the external examiner.
- i. Head of the Department shall forward the compiled total marks (awarded in internal assessment, project Report and Viva-voce Examination), in the project-semester of each of the candidate, to the Controller of Examination.

9. EXAMINATION

- a. The performance of a student in a semester shall be evaluated through continuous class assessment and end semester examination. The continuous assessment shall be based on class tests, assignments/ tutorials, quizzes/ viva voce and attendance. The end semester examination shall be comprised of written papers, practical and viva voce, inspection of certified course work in classes and laboratories, project work, design reports or by means of any combination of these methods.
- b. The marks obtained in a subject shall consist of marks allotted in end semester theory paper, practical examination and sessional work.
- c. The minimum pass marks in each subject including sessional marks (Theory, Practical or Project etc.) shall be 40%.

10. PROMOTION SCHEME

- a. A student will be required to clear minimum **40% of his/her papers** in a semester/annual examination to be eligible **for promotion to the next semester/year**. A student may appear in the supplementary examination after each semester/annual examination and can have a choice to appear in the backlog papers in the supplementary examination or in the subsequent regular semester/annual examination with a prescribed fee. A students detained due to shortage of attendance will repeat his/her paper in the subsequent semester concerned (even/odd).
- b. A **detained** Student is not allowed to re-appear in the internal assessment (Unit test). His/her old internal assessment marks will remain same.

A student who cleared all the papers of a semester/annual examination of a programme /course will be eligible for improvement examination as per university rule.

11. THE GRADING SYSTEM

As per University Rule

12. CALCULATION OF SGPA AND CGPA OF A STUDENT IN A SEMESTER

As per University Rule

After having passed all the FOUR semesters, the students shall be eligible for the award of **Master of Science (Computational & System Biology and Bioinformatics)**, degree of JAMIA HAMDARD.

13. CLASSIFICATION OF SUCCESSFUL CANDIDATES

The result of successful candidates, who fulfill the criteria for the award of **Master of Science (Computational & System Biology and Bioinformatics)**, shall be classified at the end of last semester, on the basis of his/her final CGPA (to be calculated as per university rule).