माँ शाकुम्भरी विश्वविद्यालय, सहारनपुर
Maa Shakumbhari University, Saharanpur

Post-Graduation in Computer Science

CURRICULUM & SYLLABUS

Department of Computer Science,

Affiliated Colleges

Maa Shakumbhari University, Saharanpur

(Prof. Karamjit Bhatia)   (Prof. Mahesh Kumar)   (Prof. Naveen Kumar Sharma)

(Dr. Jay Prakash)   (Prof. Praveen Kumar)

Members, Board of Studies (Computer Science)

S.No.	Name	Designation	College/ University	Signature
1.	Prof. Praveen Kumar	Professor & Convener	J. V Jain College, Saharanpur UP	
2.	Prof. Naveen Kumar Sharma	Professor & Member	D. A. V. College Muzaffarnagar UP	
3.	Prof. Jay Prakash	Assistant Professor & Member	Mahant Avaidyanath Government Degree College, Jungle Kaudiya, Gorakhpur UP	
4.	Prof. Karamjit Bhatia	Professor & Member	Gurukul Kangri (Deemed to be University), Haridwar Uttarakhand	
5.	Prof. Mahesh Kumar	Professor & Member	Thapar Institute of Engineering & Technology, Patiala, Punjab	
6.	Dr. Aashish Jain	Assistant Professor & Special Invitee	KK Jain PG College Khatuli, Muzaffarnagar	

SCHOOL OF COMPUTER SCIENCE

MAA SHAKUMBHARI UNIVERSITY, SAHARANPUR

VISION OF THE SCHOOL

To produce such academicians with morality, global competence, vision and skilled as are necessary to meet the challenges of emerging global knowledge, economy by the power of innovation, creativity and efficient learning ability.

MISSION OF THE SCHOOL

To emerge among the top institution in India within next ten years through applicability, humanity, implementing and operating dynamic-academic, administrative and functional process, for optimal use of available resources.

ABOUT THE SCHOOL OF SCIENCE – COMPUTER SCIENCE

The School of Computer Science is going to establish with the objective of promoting post-graduate studies and research in Computer Science. Computer Science is the base of all sciences therefore the importance of Computer Science in any curriculum is self-evident. This is the single science subject that is being used by all other disciplines, that is why its growth over the years has been phenomenal. In view of this, Computer Science at Post-Graduate level, is one of the subjects, which is going to introduce in the University since inception. M.Sc. were also started. From the academic session 2021-22 under graduation program (B.Sc.) under NEP2020 has already been started.

VISION

- Vision of the School of Science (Computer Science) University Campus and affiliated Colleges is to create a community of computational learning by promoting outstanding teaching, Indian knowledge system (IKS), deep understanding and creating global centre of excellence in research for the growth of the Nation and Humanity.
- To achieve high standards of excellence in generating and propagating knowledge in Computer Science.
- To provide sustainable environment to the students and researchers who can learn, teach, become innovator and use of Computer Science for humanity.

MISSION

· To provide an effective teaching-learning process.
· To impart world-class education in an environment of fundamental and applied research in Computer Science.
· To emerge as a global centre of digital learning, academic excellence and innovative research.
· To include innovative skills, teamwork and ethical practices among students so as to meet societal expectations.
· To provide quality education for higher studies and competitive like CSIR-UGC JRF/NET, GATE, SLET, Civil Services, Scientist, and research programme.

M.Sc. Computer Science Programme prerequisites

To study this programme a student must have/ had the subject Computer Science at UG level.

Programme Outcomes (PO's)

PO1: Provide opportunities in higher education and development on the professional front. It also gives the opportunity for career advancement in teaching, research, and industries.

PO2: Integration of Interdisciplinary thinking and practice.

PO3: Analyse a problem, identify and define the computing requirements with respect to organizational factors appropriate to its solution, and plan strategies for their solution.

PO4: Design, implement and evaluate information systems, processes, components, or programs and source cost-benefit efficient alternatives to meet desired needs, goals, and constraints.

PO5: Deploy and use effective skills, tools, and techniques necessary for information systems practice.

PO6: Most importantly, the program inculcates among the students the higher values which enable them to withstand the challenges of life.

PO7: Deploy and use effective skills, tools, and techniques necessary for information systems practice.

PO8: Effectively communicate about their field of expertise on their activities, with their peer and society at large, such as, being able to comprehend and write effective reports and design documentation.

Programme Specific Outcomes (PSO's)

PSO1. To develop abstract computational thinking so that students would be able to apply knowledge of Computer Science, in all the fields of learning, including higher research and its extensions.

PSO2. To provide students with knowledge and capability in formulating and analysis of computational models of real-life applications/problems.

PSO3. To provide comprehensive curriculum to groom the students into qualitative scientifically enriched manpower.

PSO3. Carry out development work as well as take up challenges in the emerging areas of the industry.

PSO4. To provide students with a knowledge, abilities and insight in Computer Science and computational techniques so that they are able to work as mathematical professional.

PSO5. Inspire to crack lectureship and fellowship exams approved by UGC/MHRD like UGC – NET, GATE and SET/ ISRO/DRDO so that high quality academicians and researchers can be prepared.

PSO6. Victorious in getting employment in different areas, such as industries, laboratories, Banks, Insurance Companies, Educational/Research institutions, Administrative positions, since the impact of the subject concerned is very wide.

PSO7. Encourage personality development skills like time management, crisis management, stress interviews and working as a team.

Syllabus M.Sc. (Computer Science)

(Effective from 2023-24)

(B.Sc. in Research – Computer Science) as per NEP2020

Year	Semester	Course Code	Core/Elective/Value Added	Paper Title	Theory/Practical/Project	Credits	Internal/Practical Marks (Max/Min)	External Marks (Min Marks)	Total Marks	Minimum Marks (INT+EXT)	Teaching Hours Lab/Theory + Tutorials
Year-4 as per NEP/ Year -1	Semester-VII as per NEP2020 /Semester-I	0720701	Core Compulsory	Design and Analysis of Algorithms	Theory	4	25(8)	75(25)	100	40	4x15=60
		0720702	Core Compulsory	Object Oriented Programming	Theory	4	25(8)	75(25)	100	40	4x15=60
		0720703	Core Compulsory	Data Communication and Computer Networks	Theory	4	25(8)	75(25)	100	40	4x15=60
			Elective Group-1	**Any ONE of the following:**							
		0720704	Core Elective	1. Artificial Intelligence	Theory	4	25(8)	75(25)	100	40	4x15=60
		0720705	Core Elective	2. Data Mining	Theory	4	25(8)	75(25)	100	40	4x15=60
		0720706	Core Elective	3. Mathematical Foundations of Computer Science	Theory	4	25(8)	75(25)	100	40	4x15=60
		0720780	Practical Lab	Object Oriented Programming	Practical	4	25(8)	75(25)	100	40	4x15=60
		0720765	Core Compulsory	Project-I	Project	4	25	75(25)	100	40	4x15=60
	Semester VIII as per	0820701	Core Compulsory	Database Management System	Theory	4	25(8)	75(25)	100	40	4x15=60

		0820702	Core Compulsory	Software Engineering	Theory	4	25(8)	75(25)	100	40	4x15=60
	NEP2020 /Semester -II	0820703	Core Compulsory	Information Security	Theory	4	25(8)	75(25)	100	40	4x15=60
			Elective Group-2	**Any ONE of the following:**							
		0820704	Core Elective	1. Combinatorial Optimization	Theory	4	25(8)	75(25)	100	40	4x15=60
		0820705	Core Elective	2. Digital Image Processing	Theory	4	25(8)	75(25)	100	40	4x15=60
		0820706	Core Elective	3. Mobile and Satellite Communication Networks	Theory	4	25(8)	75(25)	100	40	4x15=60
		0820780	Core Compulsory	DBMS Lab	Practical	4	25(8)	75(25)	100	40	4x15=60
		0820765	Core Compulsory	Project-II	Project	4	25(8)	75(25)	100	40	4x15=60

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<tr><td colspan="12" align="center">M. Sc. in Computer Science as per NEP 2020</td></tr>
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		0920701	Core Compulsory	Machine Learning	Theory	4	25(8)	75(25)	100	40	4x15=60
		0920702	Core Compulsory	Cloud Computing	Theory	4	25(8)	75(25)	100	40	4x15=60
Year-5 as per NEP/ Year -2	Semester IX as per NEP2020/ Semester - III	0920703	Core Elective	Cyber Security	Theory	4	25(8)	75(25)	100	40	4x15=60
			Elective Group-3	**Any one of the followings**							
		0920704	Core Elective	1. Neural Networks	Theory	4	25(8)	75(25)	100	40	4x15=60
		0920705	Core Elective	2. Deep Learning	Theory	4	25(8)	75(25)	100	40	4x15=60
		0920706	Core Elective	3. Data Science	Theory	4	25(8)	75(25)	100	40	4x15=60

	Code	Type	Course	Nature	Credit	Internal	External	Total	Min	Questions
	0920780	Core Practical	Machine Learning as Python Prog. lab	Practical	4	25(8)	75(25)	100	40	4x15=60
	0920765	Minor Project	Project-III	Project	4	50	150(50)	200	80	
Semester X as per NEP2020/ Semester - IV	1020765	Project Work	Industrial Training/Project	Project	24	100	400(150)	500	200	

Examination Pattern

Practical Examination: 25 Marks external

External Examination: Written Exam of 75 marks 3-Hours duration.

External Exam Pattern:

    Section-A: Attempt All Five question. Each question carries 3 marks.

    Section-B: Attempt Any Two out of three. Each Question carry 7.5 marks each.

    Section-C: Attempt Any Three out of Five. Each Question carry 15 marks each.

Minimum Marks:

1. In each individual paper Forty Marks i.e. 40% and 55% for PGDR in all courses.
2. Division in PG: First Division - CGPA 6.5 and Less than 10, Second division - CGPA 5.0 and less than 6.5. There is no provision of Third division.
3. Division in PGDR: First Division - CGPA 6.5 and Less than 10, Second division - CGPA 5.5 and less than 6.5. There is no provision of Third division

$$\text{Equivalent Percentage} = \text{CGPA} \times 9.5$$

Note: Percentage and Grading system applicable as per NEP2020 GO 1032/Sattar-2022-08(35)/2020, Higher Education Division -3, Lucknow Dated 20.04.2022