माँ शाकुम्भरी विश्वविद्यालय, सहारनपुर
Maa Shakumbhari University, Saharanpur

B.Sc.(Computer Science)
Under FYUP-NEP2020 PROGRAMME

CURRICULUM & SYLLABUS
For

Department of Computer Science
Affiliated Colleges
Maa Shakumbhari University, Saharanpur

(Effective from Session 2025-26)

Members, Board of Studies (Computer Science)

Maa Shakumbhari University, Saharanpur

S.No.	Name	Designation	College/University	Signature
1.	Prof. Praveen Kumar	Member	J. V. Jain College, Saharanpur	
2.	Prof. Naveen Sharma	Member	D.A.V. College Muzaffarnagar	
3.	Dr. Jay Prakash	Member	Mahant Avaidyanath Government Degree College, Jungle Kaudiya, Gorakhpur UP	
4.	Prof. Karamjit Bhatia	Member(External)	Gurukul Kangri University, Haridwar, UK	
5.	Prof. Mahesh Sharma	Member(External)	TIET (Deemed to be University), Patiala, PB	

Programme Objectives (POs)

PO1: Understand the fundamental concepts of computers, software hardware and peripheral devices and evolution of computer technologies.
PO2: Familiarized with business environment and information technology and its applications in different domains.
PO3: Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4: Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5: Understand the front end and backend of software applications.
PO6: Gain expertise in at least one emerging technology.
PO7: Acquire knowledge about computer networks, network devices and their configuration protocols, security concepts at various level etc.
PO8: Apply techniques of software validation and reliability analysis to the development of computer programs.
PO9: Acquire technical, communication and management skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO10: Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.
PO11: Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur

Programme Learning Outcomes(PLO):

PLO1: Communication Skills
The student should be able to communicate the technical information both orally and in writing professionally.
PLO2: Use of Software Tools
Create, select, adapt and apply suitable tools and technologies to a wide range of computational activities.
PLO3: Technical Skills
Acquire necessary knowledge of technical, scientific as well as basic managerial and financial procedures to analyze and solve real world problems within their work domain
PLO4: Domain Awareness
Clarity on both conceptual and application oriented skills in commerce, finance & accounting and it applications in business context.
PLO5: Technical Support

Must be able to provide technical support for various software applications.

PLO6: Analysis and investigation of Complex Computing Problems

Ability to analyze research and investigate complex computing problems through design of experiments, analysis and interpretation of data and synthesis of the information to arrive at valid conclusions.

PLO7: Design / Development of Solutions

Apply the knowledge gained in core courses to a broad range of advanced topics in computer science, to learn and develop sophisticated technical products independently.

PLO8: Imbibe Cyber Ethics

Awareness on ethics, values, sustainability and creativity aspects of technical solutions.

Syllabus Structure B.Sc.(CS) Program as per NEP2020

SEMESTER	PAPER CODE	PAPER TYPE	COURSE NAME	TH/PRC/PR	CR	IE (TH)	IE (PR)	EE (MinMark)	Total	Min Marks
	Certificate in Computer Science									
Sem-I	0122301	CC	Applied Mathematics	TH	4	25		75(25)	100	33
	0122302	CC	Computer Programming in C	TH	4	25		75(25)	100	33
	0122380	CC	Lab-Computer Programming in C	PRC	4			100(33)	100	33
		CCME	*(From Other Faculty)*	TH	6	25		75(25)	100	33
	0190061	SEC	Digital Electronics & Computer Fundamentals	TH+PRC	3	40	60		100	40
	0180102	AEC	First Aid and Basic Health	TH	2			100(33)	100	33
SEM-II	0222301	CC	Operating System	TH	4	25		75(25)	100	33
	0222302	CC	Data Structure using C	TH	4	25		75(25)	100	33
	0222380	CC	Lab-Data Structure using C	PRC	4			100(33)	100	33
	0290061	SEC	English Communication Practical: Group Discussion, Presentation & Picture report writting	TH+PRC	3	40	60		100	40
	0280101	AEC	Human Values and Environmental Studies	TH	2			100(33)	100	33
	Diploma in Computer Science									
Sem-III	0322301	CC	Digital System & Architecture	TH	4	25		75(25)	100	33
	0322302	CC	Object Oriented Programming with C++	TH	4	25		75(25)	100	33
	0322380	CC	Lab-OOPs with C++	PRC	4			100(33)	100	33
		CCME	*(From Other Faculty)*	TH	6	25		75(25)	100	33
	0390061	SEC	Python Programming	TH+PR	3	40	60		100	40

	0380101	AEC	Physical Education and Yoga	TH	2	25		75(25)	100	33
Sem-IV	0422301	CC	Computer Netwroking	TH	4	25		75(25)	100	33
	0422302	CC	Data Base Management System	TH	4	25		75(25)	100	33
	0422380	CC	Lab-Data Base Management System	PRC	4			100(33)	100	33
	0480101	AEC	Social Responsibility and Community Engagement	TH	2			100(33)	100	33
	0480165	SEC-PR	Inter faculty minor Project/Internship	PR	3		100		100	40
	Bachelor Degree in Computer Science									
Sem-V	0522301	CC	Software Engineering	TH	4	25		75(25)	100	33
	0522302	CC	JAVA Programming	TH	4	25		75(25)	100	33
	0522303	CC	Computer Graphics	TH	4	25		75(25)	100	33
	0522380	CC	Lab-JAVA Programming & Computer Graphics	PRC	4	25		75(25)	100	33
	0522365	SEC-PR	Project/Internship-I	PR	4		100		100	40
Sem-VI	0622301	CC	Artificial Intelligence & Machine Learning	TH	4	25		75(25)	100	33
	0622302	CC	Data Science	TH	4	25		75(25)	100	33
	0622303	CC	Cloud Computing	TH	4	25		75(25)	100	33
	0622380	CC	Lab-Data Science with Python	PRC	4	25		75(25)	100	33
	0622365	SEC-PR	Project/Internship-II	PR	4			100(40)	100	40

CC-Core Compulsory, SEC-Skill Enhancement Course, AEC-Ability Enhancement Course, EL-Elective, CR-Credits, IE-Internal Evaluation, EE-External Evaluation, TH-Theory, PRC-Practical, PR-Project

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Maa Shakumbhari University, Saharanpur

B.Sc.(Computer Science) Apprenticeship Embedded Program

Under FYUP-NEP2020 PROGRAMME

CURRICULUM & SYLLABUS

For

Department of Computer Science
Affiliated Colleges
Maa Shakumbhari University, Saharanpur

(Effective from Session 2025-26)

Syllabus Structure B.Sc.(CS) Apprenticeship Embedded Program Program as per NEP2020

SEMESTER	PAPER CODE	PAPER TYPE	COURSE NAME	TH/PRC/PR	CR	IE (TH)	IE (PR)	EE (MinMarks)	Total	Min Marks
	Certificate in Computer Science									
Sem-I	0122301	CC	Applied Mathematics	TH	4	25		75(25)	100	33
	0122302	CC	Computer Programming in C	TH	4	25		75(25)	100	33
	0122380	CC	Lab-Computer Programming in C	PRC	4			100(33)	100	33
		CCME	*(From Other Faculty)*	TH	6	25		75(25)	100	33
	0190061	SEC	Digital Electronics & Computer Fundamentals	TH+PRC	3	40	60		100	40
	0180102	AEC	First Aid and Basic Health	TH	2			100(33)	100	33
SEM-II	0222301	CC	Operating System	TH	4	25		75(25)	100	33
	0222302	CC	Data Structure using C	TH	4	25		75(25)	100	33
	0222380	CC	Lab-Data Structure using C	PRC	4			100(33)	100	33
	0290061	SEC	English Communication Practical: Group Discussion, Presentation & Picture report writting	TH+PRC	3	40	60		100	40
	0280101	AEC	Human Values and Environmental Studies	TH	2			100(33)	100	33
	Diploma in Computer Science									
Sem-III	0322301	CC	Digital System & Architecture	TH	4	25		75(25)	100	33
	0322302	CC	Object Oriented Programming with C++	TH	4	25		75(25)	100	33
	0322380	CC	Lab-OOPs with C++	PRC	4			100(33)	100	33
		CCME	*(From Other Faculty)*	TH	6	25		75(25)	100	33
	0390061	SEC	Python Programming	TH+PR	3	40	60		100	40

	0380101	AEC	Physical Education and Yoga	TH	2	25		75(25)	100	33
Sem-IV	0422301	CC	Computer Netwroking	TH	4	25		75(25)	100	33
	0422302	CC	Data Base Management System	TH	4	25		75(25)	100	33
	0422380	CC	Lab-Data Base Management System	PRC	4			100(33)	100	33
	0480101	AEC	Social Responsibility and Community Engagement	TH	2			100(33)	100	33
	0480165	SEC-PR	Inter faculty minor Project/Internship	PR	3		100		100	40
	Bachelor Degree in Computer Science with Honours									
Sem-V	0522301	CC	Software Engineering	TH	4	25		75(25)	100	33
	0522302	CC	JAVA Programming	TH	4	25		75(25)	100	33
	0522303	CC	Computer Graphics	TH	4	25		75(25)	100	33
	0522380	CC	Lab-JAVA Programming & Computer Graphics	PRC	4	25		75(25)	100	33
	0522365	SEC-PR	Project/Internship-I	PR	4		100		100	40
Sem-VI	0622301	CC	Artificial Intelligence & Machine Learning	TH	4	25		75(25)	100	33
	0622302	CC	Data Science	TH	4	25		75(25)	100	33
	0622303	CC	Cloud Computing	TH	4	25		75(25)	100	33
	0622380	CC	Lab-Data Science with Python	PRC	4	25		75(25)	100	33
	0622365	SEC-PR	Project/Internship-II	PR	4			100(40)	100	40
	Bachelor degree in Computer Science with Apprenticeship Embedded Program									
Sem-VII & VIII	**0722360**	CC	Internship/Apprenticeship(From NATS or Equivalent Organisation)	40	1200 Hrs					

CC-Core Compulsory, SEC-Skill Enhancement Course, AEC-Ability Enhancement Course, EL-Elective, CR-Credits, IE-Internal Evaluation, EE-External Evaluation, TH-Theory, PRC-Practical, PR-Project

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Maa Shakumbhari University, Saharanpur

B.Sc.(Computer Science) Honours

Under FYUP-NEP2020 PROGRAMME

CURRICULUM & SYLLABUS

For

Department of Computer Science

Affiliated Colleges

Maa Shakumbhari University, Saharanpur

(Effective from Session 2025-26)

Syllabus Structure B.Sc.(CS) Honours Program as per NEP2020

SEMESTER	PAPER CODE	PAPER TYPE	COURSE NAME	TH/PRC/PR	CR	IE (TH)	IE (PR)	EE (MinMarks)	Total	Min Marks
	Certificate in Computer Science									
Sem-I	0122301	CC	Applied Mathematics	TH	4	25		75(25)	100	33
	0122302	CC	Computer Programming in C	TH	4	25		75(25)	100	33
	0122380	CC	Lab-Computer Programming in C	PRC	4			100(33)	100	33
		CCME	*(From Other Faculty)*	TH	6	25		75(25)	100	33
	0190061	SEC	Digital Electronics & Computer Fundamentals	TH+PRC	3	40	60		100	40
	0180102	AEC	First Aid and Basic Health	TH	2			100(33)	100	33
SEM-II	0222301	CC	Operating System	TH	4	25		75(25)	100	33
	0222302	CC	Data Structure using C	TH	4	25		75(25)	100	33
	0222380	CC	Lab-Data Structure using C	PRC	4			100(33)	100	33
	0290061	SEC	English Communication Practical: Group Discussion, Presentation & Picture report writting	TH+PRC	3	40	60		100	40
	0280101	AEC	Human Values and Environmental Studies	TH	2			100(33)	100	33
	Diploma in Computer Science									
Sem-III	0322301	CC	Digital System & Architecture	TH	4	25		75(25)	100	33
	0322302	CC	Object Oriented Programming with C++	TH	4	25		75(25)	100	33
	0322380	CC	Lab-OOPs with C++	PRC	4			100(33)	100	33
		CCME	*(From Other Faculty)*	TH	6	25		75(25)	100	33
	0390061	SEC	Python Programming	TH+PR	3	40	60		100	40

	0380101	AEC	Physical Education and Yoga	TH	2	25		75(25)	100	33
Sem-IV	0422301	CC	Computer Netwroking	TH	4	25		75(25)	100	33
	0422302	CC	Data Base Management System	TH	4	25		75(25)	100	33
	0422380	CC	Lab-Data Base Management System	PRC	4			100(33)	100	33
	0480101	AEC	Social Responsibility and Community Engagement	TH	2			100(33)	100	33
	0480165	SEC-PR	Inter faculty minor Project/Internship	PR	3		100		100	40
	Bachelor Degree in Computer Science with Honours									
Sem-V	0522301	CC	Software Engineering	TH	4	25		75(25)	100	33
	0522302	CC	JAVA Programming	TH	4	25		75(25)	100	33
	0522303	CC	Computer Graphics	TH	4	25		75(25)	100	33
	0522304	CC	Design and Analysis of Algorithm	TH	4	25		75(25)	100	33
	0522380	CC	Lab-JAVA Programming & Computer Graphics	PRC	4	25		75(25)	100	33
	0522365	SEC-PR	Project/Internship-I	PR	5		100		100	40
Sem-VI	0622301	CC	Artificial Intelligence & Machine Learning	TH	4	25		75(25)	100	33
	0622302	CC	Data Science	TH	4	25		75(25)	100	33
	0622303	CC	Cloud Computing	TH	4	25		75(25)	100	33
	0622304	CC	System Analysis & Designing	TH	4	25		75(25)	100	33
	0622380	CC	Lab-Data Science with Python	PRC	4	25		75(25)	100	33
	0622365	SEC-PR	Project/Internship-II	PR	5			100(40)	100	40

CC-Core Compulsory, SEC-Skill Enhancement Course, AEC-Ability Enhancement Course, EL-Elective, CR-Credits, IE-Internal Evaluation, EE-External Evaluation, TH-Theory, PRC-Practical, PR-Project

Examination Pattern

Practical Examination: 100 Marks external

Continuous Internal Evaluation: 25 Marks (15 Marks Written exam + 05 Marks Quiz + 05 Marks Class performance and Regularity)

Continuous Internal Evaluation: 25 Marks (15 Marks Written exam + 05 Marks Quiz + 05 Marks Class performance and Regularity)

External Examination: Written Exam of 75 marks 3Hrs 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:

I- Semester to VI-Semester

1. In each individual paper Thirty three Marks i.e. 33%.
2. Division : First Division - CGPA 6.5 and Less than 10, Second division - CGPA 5.0 and less than 6.5. Third division - CGPA 4.0 and less than 5.0.

Equivalent Percentage = CGPA x 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

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Bachelor of Science with Computer Science (Apprenticeship/Internship embedded)
under FYUP-NEP2020

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 Kangari (Deemed to be University), Haridwar UK	
5.	Prof. Mahesh Kumar	Professor & Member	Thapar Institute of Engineering & Technology (Deemed to be University), , Patiala, Punjab	

MAA SHAKUMBHARI UNIVERSITY, SAHARANPUR

VISION

- 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.

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. 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.

PSO6. Encourage personality development skills like time management, crisis management, stress interviews and working as a team.

Syllabus B.Sc. Computer Science (Apprenticeship Embedded) program Under FYUP-NEP2020

(Effective from 2025-26)

Year	Semester	Course Code	Course Type	Paper Title	TH/ PRC/ PR	CR	IE	EE (Min. Marks)	Total Marks	Passing Marks
Under Graduate Certificate Course in Science										
Yr-1	Sem-I	0120701	CC	Problem Solving using Computer	TH	4	25	75(25)	100	33
		0120780	CC	Software Lab using Python	PRC	2		100	100	33
	Sem-II	0220701	CC	Database Management Systems	TH	4	25	75(25)	100	33
		0220780	CC	Database Management Systems Lab	PRC	2		100	100	33
Under Graduate Diploma Course in Science										
Yr-2	Sem-III	0320701	CC	Operating Systems	TH	4	25	75(25)	100	33
		0320780	CC	Operating Systems Lab	PRC	2		100	100	33
	Sem-IV	0420701	CC	Computer System Architecture	TH	4	25	75(25)	100	33
		0420780	CC	Computer System Architecture Lab	PRC	2		100	100	33
Under Graduate Degree Course in Science										

Yr-3	Sem-V	0520701	CC	Analysis of Algorithms and Data Structures	TH	4	25	75(25)	100	33
		0520702	CC	Soft Computing	TH	4	25	75(25)	100	33
		0520780	CC	Lab on Algorithms and Data Structures with C++	PRC	2		100	100	33
	Sem-VI	0620701	CC	Data Communication and Computer Networks	TH	4	25	75(25)	100	33
		0620702	CC	Cyber Security & Cyber Laws	TH	4	25	75(25).	100	33
		0620780	CC	Lab on Computer Networks	PRC	2		100	100	33
Apprenticeship/ Internship embedded UG degree program										
Yr-4	Sem-VII & VIII	0720760	CC	Apprenticeship/ Internship (12 Months Apprenticeship/ Internship through NATS or from other equivalent organisation/ industry/ institute)	INT	40		1200 Hrs		

CC-Core Compulsory, CEL- Core Elective, CR-Credits, IE-Internal Evaluation, EE-External Evaluation, TH-Theory, PRC-Practical, PR-Project, INT-Internship

Examination Pattern

Practical Examination: 100 Marks external

Continuous Internal Evaluation: 25 Marks (15 Marks Written exam + 05 Marks Quiz + 05 Marks Class performance and Regularity)

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Bachelor of Science with Computer Science (Honours) under FYUP-NEP2020

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DEPARTMENT OF COMPUTER SCIENCE,

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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.

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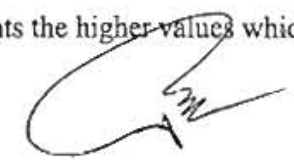
PO5: Deploy and use effective skills, tools, and techniques necessary for information systems practice.

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.

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Syllabus B.Sc. Computer Science(Honours) Under FYUP-NEP2020

(Effective from 2025-26)

Year	Semester	Course Code	Course Type	Paper Title	TH/ PRC/ PR	CR	IE	EE (Min. Marks)	Total Marks	Passing Marks
Under Graduate Certificate Course in Science										
Yr-1	Sem-I	0120701	CC	Problem Solving using Computer	TH	4	25	75(25)	100	33
		0120780	CC	Software Lab using Python	PRC	2		100	100	33
	Sem-II	0220701	CC	Database Management Systems	TH	4	25	75(25)	100	33
		0220780	CC	Database Management Systems Lab	PRC	2		100	100	33
Under Graduate Diploma Course in Science										
Yr-2	Sem-III	0320701	CC	Operating Systems	TH	4	25	75(25)	100	33
		0320780	CC	Operating Systems Lab	PRC	2		100	100	33
	Sem-IV	0420701	CC	Computer System Architecture	TH	4	25	75(25)	100	33
		0420780	CC	Computer System Architecture Lab	PRC	2		100	100	33
Under Graduate Degree Course in Science										
		0520701	CC	Analysis of Algorithms and Data Structures	TH	4	25	75(25)	100	33

Yr-3	Sem-V	0520702	CC	Soft Computing	TH	4	25	75(25)	100	33
		0520780	CC	Lab on Algorithms and Data Structures with C++	PRC	2		100	100	33
	Sem-VI	0620701	CC	Data Communication and Computer Networks	TH	4	25	75(25)	100	33
		0620702	CC	Cyber Security & Cyber Laws	TH	4	25	75(25)	100	33
		0620780	CC	Lab on Computer Networks	PRC			100	100	33
B.Sc. Honours in Computer Science										
Yr-4	Sem-VII	0720701	CC	Design and Analysis of Algorithms	TH	4	25	75(25)	100	40
		0720702	CC	Object Oriented Programming Using C++	TH	4	25	75(25)	100	40
		0720705	CC	Data Communication and Computer Networks	TH	4	25	75(25)	100	40
		Elective G-1 Any one of the following:								
		0720704	CEL	1. Artificial Intelligence	TH	4	25	75(25)	100	40
		0720703	CEL	2. Data Mining	TH	4	25	75(25)	100	40
		0720706	CEL	3. Mathematical Foundations of Computer Science	TH	4	25	75(25)	100	40
		0720780	CC	Lab1-Object Oriented Programming Using C++	PRC	4		100	100	40
		0820701	CC	Data Base Management System	TH	4	25	75(25)	100	40
		0820702	CC	Software Engineering	TH	4	25	75(25)	100	40

Sem-VIII	0820703	CC	Information Security	TH	4	25	75(25)	100	40
	Elective G-1 Any one of the following:								
	0820704	CEL	1. Digital Image Processing	TH	4	25	75(25)	100	40
	0820705	CEL	2. Combinatorial Optimization	TH	4	25	75(25)	100	40
	0820706	CEL	3. Mobile and Satellite Communication Networks	TH	4	25	75(25)	100	40
	0820780	CC	Lab2- Data Base Management Systems	PRC	4		100	100	40

CC-Core Compulsory, CEL- Core Elective, CR-Credits, IE-Internal Evaluation, EE-External Evaluation, TH-Theory, PRC-Practical, PR-Project

Examination Pattern

Practical Examination: 100 Marks external

Continuous Internal Evaluation: 25 Marks (15 Marks Written exam + 05 Marks Quiz + 05 Marks Class performance and Regularity)

External Examination: Written Exam of 75 marks 3Hrs 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. I- Semester to VI-Semester

1. In each individual paper Thirty Three Marks i.e. 33%.
2. Division : First Division - CGPA 6.5 and Less than 10, Second division - CGPA 5.0 and less than 6.5. Third division - CGPA 4.0 and less than 5.0.

1. VII- Semester to VIII-Semester

1. In each individual paper Forty Marks i.e. 40%.
2. Division in PG: First Division - CGPA 7.0 and Less than 10, Second division - CGPA 5.0 and less than 7.0. There is no provision of Third division.

Equivalent Percentage = CGPA x 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

माँ शाकुम्भरी विश्वविद्यालय, सहारनपुर
Maa Shakumbhari University, Saharanpur

Bachelor of Science Computer Science Honours with Research

under FYUP-NEP2020

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 Kangari (Deemed to be University), Haridwar UK	
5.	Prof. Mahesh Kumar	Professor & Member	Thapar Institute of Engineering & Technology (Deemed to be University), , Patiala, Punjab	

MAA SHAKUMBHARI UNIVERSITY, SAHARANPUR

VISION

- 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.

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. 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.

PSO6. Encourage personality development skills like time management, crisis management, stress interviews and working as a team.

Syllabus B.Sc. Computer Science (Honours with Research) Under FYUP-NEP2020

(Effective from 2025-26)

Year	Semester	Course Code	Course Type	Paper Title	TH/ PRC/ PR	CR	IE	EE (Min. Marks)	Total Marks	Passing Marks
Under Graduate Certificate Course in Science										
Yr-1	Sem-I	0120701	CC	Problem Solving using Computer	TH	4	25	75(25)	100	33
		0120780	CC	Software Lab using Python	PRC	2		100	100	33
	Sem-II	0220701	CC	Database Management Systems	TH	4	25	75(25)	100	33
		0220780	CC	Database Management Systems Lab	PRC	2		100	100	33
Under Graduate Diploma Course in Science										
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		0520780	CC	Lab on Algorithms and Data Structures with C++	PRC	2		100	100	33
	Sem-VI	0620701	CC	Data Communication and Computer Networks	TH	4	25	75(25)	100	33
		0620702	CC	Cyber Security & Cyber Laws	TH	4	25	75(25)	100	33
		0620780	CC	Lab on Computer Networks	PRC		100	100	33	

B.Sc. Honours with research in Computer Science
(Only those students can continue for this degree who secure more than 75% marks in First Six Semesters)

Yr-4	Sem-VII	0720701	CC	Design and Analysis of Algorithms	TH	4	25	75(25)	100	40
		0720702	CC	Object Oriented Programming Using C++	TH	4	25	75(25)	100	40
		Elective G-1 Any one of the following:								
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		0720705	CEL	3. Data Mining	TH	4	25	75(25)	100	40
		0720706	CEL	4. Mathematical Foundations of Computer Science	TH	4	25	75(25)	100	40
		0720765	CC	Project-I	PR	4		100	100	40
		0720780	CC	Lab1-Object Oriented Programming Using C++	PRC	4		100	100	40
		0820701	CC	Data Base Management System	TH	4	25	75(25)	100	40

Sem-VIII	0820702	CC	Software Engineering	TH	4	25	75(25)	100	40
	Elective G-1 Any one of the following:								
	0820703	CEL	1. Information Security	TH	4	25	75(25)	100	40
	0820704	CEL	2. Digital Image Processing	TH	4	25	75(25)	100	40
	0820705	CEL	3. Combinatorial Optimization	TH	4	25	75(25)	100	40
	0820706	CEL	4. Mobile and Satellite Communication Networks	TH	4	25	75(25)	100	40
	0820765	CC	Project -II	PR	4		100	100	40
	0820780	CC	Lab2- Data Base Management Systems	PRC	4		100	100	40

CC-Core Compulsory, CEL- Core Elective, CR-Credits, IE-Internal Evaluation, EE-External Evaluation, TH-Theory, PRC-Practical, PR-Project

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1. **VII- Semester to VIII-Semester**

    1. In each individual paper Forty Marks i.e. 40%.
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