

**BACHELOR DEGREE PROGRAM IN DATA SCIENCE
CURRICULUM FOR THE ACADEMIC SESSION 2024 AND ONWARDS**

Eligibility Criteria, Duration of the Program and Award of Degree:

- Minimum 50% marks in Intermediate/12 years schooling/A- Level (HSSC) or Equivalent with Mathematics are required for admission in all BS Computing Programs.
**Equivalency certificate by IBCC will be required in case of education from some other country or system.*
- The students who have not studied Mathematics at intermediate level have to pass deficiency courses of Mathematics (06 credits) in first two semesters.
- At minimum 136 credit hours are required for award of BS degrees in any computing discipline mentioned in this document.
- The minimum duration for completion of BS Computing degrees is four years. The HEC allows maximum period of seven years to complete BS degree requirements.
- A minimum 2.0 CGPA (Cumulative Grade Point Average) on a scale of 4.0 is required for award of BS Computing Degree.
- The students after successful completion of 04 semesters in BS Computing Programs may exit with Associate Degree in Computing subject to completion of all requirements for the award of associate degree, i.e., Credit Hours, CGPA, and compulsory courses.

**SCHEME OF STUDIES FOR BS IN DATA SCIENCE
STRUCTURE OF BS (DS) PROGRAM 2024 ONWARDS**

AREAS COVERED IN BSCS PROGRAM

Areas	Credit Hours	Courses
Computing Core	46	14
Domain Core	18	6
Domain Elective	21	7
University Electives	6	2
Mathematics & Supporting Courses	9	3
Elective Supporting Courses	2	1
General Education Requirement	29	12
Totals	130	45

Semester-I				
	Course Title	Pre-Reqs	Domain	Cr hr (Cont hr)
1	Programming Fundamentals		Core	4 (3-3)
2	Introduction to Information & Communication Technologies		GER	3 (2-3)
3	Perspective In Social Sciences		GER	2 (2-0)
4	Applied Physics		GER	3 (2-3)
5	English Composition and Comprehension		GER	3 (3-0)
6	Calculus and Analytical Geometry		Maths	3 (3-0)
	Pre-Calculus-I (Before Regular Session)		MDC	3 (3-0)*
			Total Cr Hrs	18 (15-9)
Semester-II				
7	Object Oriented Programming	PF	Core	4 (3-3)
8	Pakistan Study		GER	2 (2-0)
9	Digital Logic Design	AP	Core	3 (2-3)
10	Islamic Studies		GER	2 (2-0)
11	Discrete Structures		GER	3 (3-0)
12	Communication and Presentation Skills		GER	3 (3-0)
	Pre-Calculus-II (Before Regular Session)		MDC	3 (3-0)*
			Total Cr Hrs	17 (16-9)
First Year Total				35 (31-18)
Semester -III				
13	Data Structures	OOP	Core	4 (3-3)
14	Software Engineering		Core	3 (3-0)
15	Operating Systems		Core	3 (2-3)
16	Database Systems		Core	4 (3-3)

17	Creative Arts and Communication		GER	2 (1-1)
18	Linear Algebra	CAG	Maths	3 (3-0)
			Total Cr Hrs	19 (15-10)
Semester-IV				
19	Computer Organization & Assembly Language	DLD	Core	3 (2-3)
20	Introduction to Data Science		Domain Core	3 (2-3)
21	Advanced Statistics		Domain Core	3 (2-3)
22	Probability & Statistics		Maths	3 (3-0)
23	Computer Networks		Core	3 (2-3)
24	Dynamics of Natural Sciences		GER	3 (2-1)
			Total Cr Hrs	18 (14-10)
Second Year Total				37 (29-20)
Semester-V				
25	Information Security		Core	3 (2-3)
26	Analysis of Algorithms		Core	3 (3-0)
27	Data Mining		Domain Core	3 (2-3)
28	Domain Elective 1		Domain Elective	3 (2-3)
29	Domain Elective 2		Domain Elective	3 (2-3)
30	Technical and Business Writing	ECC	EW	2 (2-0)
			Total Cr Hrs	17 (13-12)
Semester-VI				
31	Data Visualization		Domain Core	3(2-3)
32	Artificial Intelligence		Core	3 (2-3)
33	Entrepreneurship		GER	2 (2-0)
34	Domain Elective 3		Domain Elective	3 (2-3)

35	Domain Elective 4		Domain Elective	3 (2-3)
36	Domain Elective 5		Domain Elective	3 (2-3)
			Total Cr Hrs	17 (12-15)
Third Year Total				34 (25-27)
Semester-VII				
37	Final Year Project - I		Core	2 (0-6)
38	Data Warehousing & Business Intelligence		Domain Core	3 (2-3)
39	Parallel & Distributed Computing	OS	Domain Core	3 (2-3)
40	Accounting and Management		University Elective	2(2-0)
41	Professional Practices		GER	2 (2-0)
42	Civics and Community Management		(Non-Credit)	NA-NC
			Total Cr Hrs	12 (8-12)
Semester-VIII				
43	Final Year Project - II		Core	4 (0-12)
44	Domain Elective 6		Domain Elective	3 (3-0)
45	Domain Elective 7		Domain Elective	3 (3-0)
46	Digital Marketing		University Elective	2 (2-0)
			Total Cr Hrs	12 (8-12)
Fourth Year Total				24 (17-24)

* Extra 6 credit hours of Pre-Calculus I and Pre-Calculus II courses are only for students of Intermediate (Pre-Medical) group. The grade of these courses shall only be Pass/Fail to enable equivalent CGPA for both students of Intermediate (Pre-Medical) group and Intermediate (Pre-Engineering) in the same batch. Also, the grade of these courses shall be mentioned / shown in the BS (CS) transcript / mark sheet of students of Intermediate (Pre-Medical) group.

* Course Codes shall be shared to members of the Board of Studies by circulation for approval

* Domain elective courses shall be approved by the chairman of department from the approved list.

LIST OF DOMAIN ELECTIVIES

S. No	Course Title		Credit Hours
1.	Web Technologies		3
2.	Mobile Application Development 1		3
3.	Advance Database Management System	DS	3 (2+1)
4.	Advanced Programming (Old Name: Visual Programming)		3
5.	Web Engineering		3
6.	Cyber Security		3
7.	Software Testing & Quality Assurance		3
8.	Mobile Application Development 2		3
9.	Cloud Computing		3
10.	Data Mining	AI	3 (2+1)
11.	Deep Learning		3
12.	Speech Processing	AI	3 (2+1)
13.	Natural Language Processing	AI	3 (2+1)
14.	Theory of Automata	AI & DS (2+1)	3 (3)
15.	Human-Computer Interaction and Computer Graphics	AI & DS	3 (2+1)
16.	Reinforcement Learning	AI	3 (2+1)
17.			
18.	Cloud Security		3
19.	Big Data Analytics	DS	3 (2+1)
20.	Machine Learning	DS	3 (2+1)
21.	Artificial Neural Networks & Deep Learning	DS	3 (2+1)
22.	Text Mining		3
23.	Topics in Data Science	DS	3 (2+1)
24.	Software Project and Quality Management		3
25.	Expert Systems	AI	3
26.	Pervasive and Ubiquitous computing		3
27.	Data Warehousing	DS	3 (2+1)
28.	Block chain		3
29.	Topics in Cybersecurity		
30.	Topics in Computing		

* Elective courses are not limited to the list above. More courses/subjects may be added anytime by the approval of the Chairperson of the Department.