Scheme of Study for Bachelor of Science in Computer Science
BS (CS)
For the Affiliated Colleges

4-Year program (8 Regular Semesters of 18 weeks each)

#	Category		# of Courses	Credit Hours
1	Computing Courses		14	51
	Core Courses	(Comp-Core)	10	39
	Supporting Areas * Mathematics & Science Foundation	(Comp-Supp)	4	12
2	Computer Science Courses		15	48
	CS Core Courses	(CS-Core)	7	24
	CS Supporting Courses	(CS-Supp)	3	9
	CS Elective Courses	(CS-Elec)	5	15
3	General Education Courses	(Gen-Edu)	7	21
4	University Electives	(Univ-Elec)	5	15
5	*Zero Mathematics Courses*		2	6**
		Total	41	135

Semester – I: (15 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	EWRT 101	*Gen-Edu*	Expository Writing	3(3,0)	
2	NSCI 103	*Comp-Supp*	General Science	3(3,0)	
3	SSCI 105	*Univ-Elec*	Social Science – I	3(3,0)	
4	QREA 107	*Comp-Core*	Exploring Quantitative Skills	3(3,0)	
5	AHUM 109	*Univ-Elec*	Literary Classics	3(3,0)	
	MZ-111		Zero Mathematics (Part I)**	3(3,0)	

Semester – II: (15 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	EWRT 102	Gen-Edu	Cross Cultural Communication and Translation Skills	3(3,0)	
2	NSCI 104	Univ-Elec	Science of Global Challenges	3(3,0)	
3	SSCI 106	Univ-Elec	Social Science – II	3(3,0)	
4	QREA 108	Comp-Supp	Tools for Quantitative Reasoning	3(3, 0)	
5	AHUM 110	Univ-Elec	History and Civilization	3(3,0)	
	MZ-112		Zero Mathematics (Part II)**	3(3,0)	

Semester – III: (19 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	EWRT 201	Gen-Edu	Critical Reasoning and Academic Writing	3(3,0)	
2	PAKS 203	Gen-Edu	Pakistan Studies	3(3,0)	
3	ISLS 205 ETHC 207	Gen-Edu	Islamic Studies or Ethics (Only for Non-Muslims)	3(3,3)	
4	CS-209	Comp-Core	Programming Fundamentals	4(3,1)	
5	CS-211	Gen-Edu	Introduction to ICT	3(2,1)	
6	MT-213	Comp-Supp	Calculus and Analytical Geometry	3(3,0)	

Semester – IV: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-202	Comp-Core	Object Oriented Programming	4(3,1)	Programming Fundamentals
2	CS-204	Comp-Core	Database Systems	4(3,1)	
3	CS-206	Comp-Core	Operating Systems	4(3,1)	
4	CS-208	Comp-Core	Software Engineering	3(3,0)	
5	MT-210	Comp-Supp	Linear Algebra	3(3,0)	

Semester – V: (17 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-301	Comp-Core	Data Structures and Algorithms	4(3,1)	
2	CS-303	CS-Core	Theory of Automata	3(3,0)	
3	CS-305	CS-Elec	CS Elective – I (Visual Programming)	3(2,1)	
4	CS-307	CS-Core	Computer Organization & Assembly Language	4(3,1)	
5	MT-309	CS-Supp	Multi-Variate Calculus	3(3,0)	

Semester – VI: (17 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-302	CS-Core	Digital Logic Design	4(3,1)	
2	CS-304	Comp-Core	Computer Networks	4(3,1)	
3	CS-306	CS-Elec	CS Elective – II (Web Engineering)	3(2,1)	
4	CS-308	CS-Elec	CS Elective – III	3(3,0)	
5	MT-310	CS-Supp	Differential Equation	3(3,0)	

Semester – VII: (16 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-401	CS-Core	Parallel & Distributed Computing	3(3,0)	Operating Systems
2	CS-403	CS-Core	Design & Analysis of Algorithms	3(3,0)	Data Structures & Algorithms
3	CS-405	CS-Core	Artificial Intelligence	4(3,1)	
4	CS-407	Comp-Core	Information Security	3(3,0)	
5	CS-409	CS-Supp	Numerical Computing	3(3,0)	

Semester – VIII: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-402	CS-Core	Compiler Construction	3(3,0)	
2	CS-404	Gen-Edu	Professional Practices	3(3,0)	
3	CS-406	CS-Elec	CS Elective – IV	3(3,0)	
4	CS-408	CS-Elec	CS Elective – V	3(3,0)	
5	CS-410	Comp-Core	Final Year Project	6(0,6)	

Semester	Comp-Core	Comp-Supp (Math & Science Foundation)	CS-Core	CS-Supp	CS-Elec	Gen-Edu	Univ-Elec	Zero-Mathematics	Total (Cr. Hrs.)
1	3	3				3	3+3	(3)	15
2		3				3	3+3+3	(3)	15
3	4	3				3+3+3+3			19
4	3+4+4+4	3							18
5	4		3+4	3	3				17
6	4		4	3	3+3				17
7	3		3+3+4	3					16
8	6		3		3+3	3			18
Total	39	12	24	9	15	21	15	--	135
Total No of Course	10	4	7	3	5	7	5	--	41

* Two alphabetic characters (MG or SS) to be used for the respective course from the university elective course list.

: **Non-credit "Zero Mathematics" course is introduced in compliance with NCEAC policy for Pre-Medical Students. It is mandatory for pre-medical students to pass non-credit "**Zero Mathematics**" (Part-I and Part-II) within 1st year of BS(CS) to confirm their admission, otherwise their admission shall stand cancelled.

Nazra Quran (Non-credit course, Total of 1 Credit Hour equals to 15 Hours of teaching in each semester will be offered during the whole course of BSCS as per Policy of the Government of Punjab and notified vide letter No. GS(Univ-1)-1/2020-435).

Electives for BS (CS)

CS Elective Courses:

#	Category	Course Title	Credit Hours	Prerequisites
1	CS-Elec	Computer Graphics	2-1	Programming Fundamentals
2	CS-Elec	Digital Image Processing	2-1	Data Structures & Algorithm
3	CS-Elec	Visual Programming	2-1	Programming Fundamentals
4	CS-Elec	Distributed Computing	2-1	Operating Systems
5	CS-Elec	Network Security	3-0	Data Comm. & Networks
6	CS-Elec	Computer Vision	3-0	
7	CS-Elec	Systems Programming	2-1	Operating Systems
8	CS-Elec	Distributed Database Systems	2-1	Intro. to Database Systems
9	CS-Elec	Data Warehousing	3-0	Intro. to Database Systems
10	CS-Elec	Web Engineering	2-1	Programming Fundamentals
11	CS-Elec	Web Design and Development	2-1	Programming Fundamentals
12	CS-Elec	Artificial Neural Networks	2-1	Discrete Structures
13	CS-Elec	Expert Systems	2-1	Discrete Structures
14	CS-Elec	Fuzzy Logic System	2-1	Discrete Structures
15	CS-Elec	Operations Research	3-0	
16	CS-Elec	Network Programming	2-1	Data Comm. & Networks
17	CS-Elec	Wireless Networks	3-0	Data Comm. & Networks
18	CS-Elec	Telecommunication Systems	2-1	Data Comm. & Networks
19	CS-Elec	Mobile Computing	2-1	Data Comm. & Networks
20	CS-Elec	Mobile Application and Development	3-0	Programming Fundamentals
21	CS-Elec	Java Programming	2-1	Programming Fundamentals
22	CS-Elec	Android Programming	2-1	
23	CS-Elec	Cloud Computing	2-1	
24	CS-Elec	Cyber Security	3-0	
25	CS-Elec	Object-Oriented Analysis & Design	3-0	Intro to Software Engg
26	CS-Elec	Ethical Hacking	2-1	
27	CS-Elec	Social Computing	3-0	
28	CS-Elec	Computational Intelligence	3-0	Discrete Structures
29	CS-Elec	Multi-Agent Systems	3-0	Data Comm. & Networks
30	CS-Elec	Natural Language Processing	3-0	Discrete Structures
31	CS-Elec	Game Development	3-0	Object-Oriented Programming
32	CS-Elec	Logical Paradigms of Computing	3-0	Discrete Structures
33	CS-Elec	Principles of Programming Languages	3-0	Programming Fundamentals
34	CS-Elec	Formal Methods in Software Engineering	3-0	Discrete Structures
35	CS-Elec	Fundamentals of Data Mining	3-0	Intro to Database Systems
36	CS-Elec	Computer Architecture	3-0	

University Electives Courses:

#	Course Code	Category	Course Title	Credit Hours
1	MG	Univ-Elec	Financial Accounting	3-0
2	MG	Univ-Elec	Financial Management	3-0
3	MG	Univ-Elec	Human Resource Management	3-0
4	MG	Univ-Elec	Marketing	3-0
5	MG	Univ-Elec	Entrepreneurship	3-0
6	SS	Univ-Elec	Economics	3-0
7	SS	Univ-Elec	Philosophy	3-0
8	SS	Univ-Elec	Psychology	3-0
9	SS	Univ-Elec	International Relations	3-0
10	SS	Univ-Elec	Foreign/Regional Languages (French, German, Chinese, Japanese, Russian, Sindhi, Punjabi, Balochi, Pashto etc.)	3-0
11	SS	Univ-Elec	Literary Classics	3-0
12	SS	Univ-Elec	History and Civilization	3-0