

## Scheme of Study for Bachelor of Science in Computer Science BS (CS)

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

#	Category	# of Courses	Credit Hours
1	<b>Computing Courses</b>	<b>15</b>	<b>54</b>
	Core Courses (Comp-Core)	10	39
	Supporting Areas (Comp-Supp) <i>* Mathematics &amp; Science Foundation</i>	5	15
2	<b>Computer Science Courses</b>	<b>15</b>	<b>48</b>
	CS Core Courses (CS-Core)	7	24
	CS Supporting Courses (CS-Supp)	3	9
	CS Elective Courses (CS-Elec)	5	15
3	<b>General Education Courses (Gen-Edu)</b>	<b>7</b>	<b>19</b>
4	<b>University Electives (Univ-Elec)</b>	<b>4</b>	<b>12</b>
5	<b>Zero Mathematics Courses</b>	<b>2</b>	<b>6**</b>
	<b>Total</b>	<b>41</b>	<b>133</b>

\*\* : 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 1<sup>st</sup> year of BS(CS) to confirm their admission, otherwise their admission shall stand cancelled.

### Semester – I: (16 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-101	Comp-Core	Programming Fundamentals	4(3,1)	
2	CS-103	Gen-Edu	Introduction to ICT	3(2,1)	
3	EG-105	Gen-Edu	English Composition & Comprehension	3(3,0)	
4	*107	Univ-Elec	Univ Elective – I (Financial Accounting)	3(3,0)	
5	PH-109	Comp-Supp	Applied Physics	3(3,0)	
6	MZ-111		Zero Mathematics (Part I)**	3(3,0)	

**Semester – II: (16 Credit Hours)**

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-102	Comp-Core	Object Oriented Programming	4(3,1)	Programming Fundamentals
2	CS-106	Comp-Core	Discrete Structures	3(3,0)	
3	EG-108	Gen-Edu	Communication & Presentation Skills	3(3,0)	
4	<b>PH-114</b>	<b>Comp-Supp</b>	<b>Basic Electronics</b>	3(3,0)	
5	*110	Univ-Elec	Univ Elective – II (Human Resource Management)	3(3,0)	
	MZ-112		<i>Zero Mathematics (Part II)**</i>	3(3,0)	

**Semester – III: (18 Credit Hours)**

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-202	Comp-Core	Database Systems	4(3,1)	
2	MT-201	Comp-Supp	Probability & Statistics	3(3,0)	
3	CS-207	Comp-Core	Operating Systems	4(3,1)	
4	EG-308	Gen-Edu	Technical & Business Writing	3(3,0)	
5	SS-406	Gen-Edu	Islamic Studies/ Ethics	2(2,0)	
6	SS-407	Gen-Edu	Pakistan Studies	2(2,0)	

**Semester – IV: (16 Credit Hours)**

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-205	Comp-Core	Data Structures and Algorithms	4(3,1)	
2	CS-209	Comp-Core	Software Engineering	3(3,0)	
3	CS-208	CS-Elec	CS Elective – I (Visual Programming)	3(2,1)	
4	*408	Univ-Elec	University Elective – IV (Economics)	3(3,0)	
5	*409	Univ-Elec	University Elective – III (Entrepreneurship)	3(3,0)	

**Semester – V: (18 Credit Hours)**

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-301	CS-Core	Computer Organization & Assembly Language	4(3,1)	
2	CS-104	CS-Core	Digital Logic Design	4(3,1)	
3	MT-203	Comp-Supp	Calculus and Analytical Geometry	3(3,0)	
4	CS-305	Comp-Core	Computer Networks	4(3,1)	
5	CS-307	CS-Elec	CS Elective – II (Web Engineering)	3(2,1)	

**Semester – VI: (16 Credit Hours)**

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-206	CS-Core	Theory of Automata	3(3,0)	
2	CS-204	CS-Core	Design & Analysis of Algorithms	3(3,0)	Data Structures & Algorithms
3	CS-304	CS-Core	Artificial Intelligence	4(3,1)	Discrete Structures
4	MT-309	Comp-Supp	Linear Algebra	3(3,0)	
5	CS-306	CS-Elec	CS Elective – III	3(3,0)	

**Semester – VII: (15 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-302	CS-Core	Compiler Construction	3(3,0)	
3	CS-403	CS-Supp	Numerical Computing	3(3,0)	
4	MT-310	CS-Supp	Differential Equation	3(3,0)	
5	CS-405	CS-Elec	CS Elective – IV	3(3,0)	

**Semester – VIII: (18 Credit Hours)**

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS-402	Comp-Core	Information Security	3(3,0)	
2	CS-303	Gen-Edu	Professional Practices	3(3,0)	
3	MT-210	CS-Supp	Multi-Variate Calculus	3(3,0)	
4	CS-404	CS-Elec	CS Elective – V	3(3,0)	
5	CS-410	Comp-Core	Final Year Project	6(0,6)	

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

Study Scheme BS(CS)

Semester	Comp-Core	Comp-Supp (Math & Science Foundation)	CS-Core	CS-Supp	CS-Elec	Gen- Edu	Univ-Elec	Zero- Mathematics	Total (Cr. Hrs.)
1	4	3				3+3	3	3**	16
2	4+3	3				3	3	3**	16
3	4+4	3				3+2+2			18
4	4+3				3		3+3		16
5	4	3	4+4		3				18
6		3	3+3+4		3				16
7			3+3	3+3	3				15
8	3+6			3	3	3			18
<b>Total</b>	<b>39</b>	<b>15</b>	<b>24</b>	<b>9</b>	<b>15</b>	<b>19</b>	<b>12</b>		<b>133</b>
<b>Total No of Course</b>	<b>10</b>	<b>5</b>	<b>7</b>	<b>3</b>	<b>5</b>	<b>7</b>	<b>4</b>	--	<b>41</b>

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**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



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