

Scheme of Study for Bachelor of Science in Computer Science BS (CS)
4-year programme (8 semesters)

#	Category	# of Courses	Credit Hours
1	Computing Courses	16	52
	Core Courses (Comp-Core)	12	40
	Supporting Areas (Comp-Supp)	4	12
2	Computer Science Courses	16	48
	CS Core Courses (CS-Core)	7	21
	CS Elective Courses (CS-Elec)	6	18
	CS Supporting Courses (CS-Supp)	3	9
3	General Education Courses (Gen-Edu)	7	19
4	University Electives (Univ-Elec)	4	12
	Total	43	131

Semester-I: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 101	Comp-Core	Programming Fundamentals	4 (3,1)	
2	CS 103	Comp-Core	Discrete Structures	3 (3,0)	
3	MT 105	Comp-Supp	Calculus and Analytical Geometry	3 (3,0)	
4	EG 107	Gen-Edu	Functional English (English-I)	3 (3,0)	
5	PK 109	Gen-Edu	Islamic Studies/ Ethics	2 (2,0)	
6	CS 111	Gen-Edu	Intro. to Information and Communication Technology	3 (2,1)	

Semester-II: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 102	Comp-Core	Object Oriented Programming	4 (3,1)	Programming Fundamentals
2	EL 104	Comp-Supp	Basic Electronics	3 (2,1)	
3	MT 106	Comp-Supp	Linear Algebra	3 (3,0)	
4	EG 108	Gen-Edu	Communication Skills (English-II)	3 (3,0)	
5	PK 110	Gen-Edu	Pakistan Studies	2 (2,0)	
6	* 112	Univ-Elec	Univ Elective-1	3	

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Semester-III: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 201	Comp-Core	Digital Logic Design	3 (2,1)	
2	CS 203	Comp-Core	Data Structures and Algorithms	3 (2,1)	Programming Fundamentals
4	MT 205	Comp-Supp	Probability and Statistics	3 (3,0)	
4	EG 207	Gen-Edu	Technical & Report Writing (English-III)	3 (3,0)	
5	* 209	Univ-Elec	Univ Elective-2	3 (3,0)	
6	* 211	Univ-Elec	Univ Elective-3	3 (3,0)	

Semester-IV: (15 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 202	Comp-Core	Intro. to Software Engineering	3 (3,0)	
2	CS 204	CS-Core	Computer Architecture & Organization	3 (3,0)	
3	CS206	CS-Core	Microprocessor & Assembly Language	3 (2,1)	
4	ST 208	CS-Supp	Multivariate Calculus	3 (3,0)	Calculus & Analytical Geometry
5	* 210	Univ-Elec	Univ Elective-4	3	

Semester-V: (17 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 301	Comp-Core	Operating Systems	4 (3,1)	
2	CS 303	Comp-Core	Intro. to Database Systems	4 (3,1)	
3	CS 305	CS-Core	Theory of Automata	3 (3,0)	
4	CS 307	CS-Core	Design and Analysis of Algorithms	3 (3,0)	Data Structures & Algorithms
5	ST 309	CS-Supp	Differential Equations	3 (3,0)	

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Semester-VI: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 302	Comp-Core	Data Communications and Computer Networks	3 (3,0)	
2	CS 304	Comp-Core	Human-Computer Interaction	3 (2,1)	
3	CS 306	CS-Core	Artificial Intelligence	3 (2,1)	Discrete Structures
4	CS 308	CS-Elec	CS Elective-1	3	
5	CS 310	CS-Elec	CS Elective-2	3	
6	CS 312	CS-Elec	CS Elective-3	3	

Semester-VII: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 401	CS-Core	Compiler Construction	3 (2,1)	Theory of Automata
2	CS 403	CS-Core	Information Security	3 (3,0)	
3	SS 405	Gen-Edu	Professional Practices	3	
4	CS 407	CS-Elec	CS Elective-4	3	
5	CS 409	CS-Elec	CS Elective-5	3	
6	CS 411	Comp-Core	Final-Year-Project-1	3	

Semester-VIII: (9 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Prerequisites
1	CS 402	CS-Supp	Numerical Computing	3 (2,1)	
2	CS 404	CS-Elec	CS Elective-6	3	
3	CS ***	Comp-Core	Final-Year-Project-2	3	

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

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Electives for BS (CS)

CS Elective Courses:

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

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University Electives Courses:

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

The detailed outline for the above courses (Computing Core, Computing Supporting, Computing General Education, CS-Core, CS-Supporting, and CS-Electives) is provided in the following document of the Higher Education Commission (HEC) of Pakistan.

“Curriculum of Computer Science, Information Technology, and Software Engineering BS/MS (Revised 2013)” [pages 19-44]

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