

Proposed Curriculum for BS-CS

Table 1.1: Areas Covered in BS programs

Course Group	Credit hours	% age
General Education	19	15%
University Electives	12	9%
Mathematics & Science Foundation	12	9%
Computing – Core	39	30%
Common courses	82	63%
Domain CS		
Domain CS Core	24	18%
Domain CS Electives	15	12%
Domain CS Supporting	9	7%
Domain courses	48	37%
TOTAL	130	100%

Courses common for all computing BS programs – 82 Credits

Computing Core Courses

Course Title	Credit hours
Programming Fundamentals	3-1
Object Oriented Programming	3-1
Data Structures & Algorithms	3-1
Discrete Structures	3-0
Operating Systems	3-1
Database Systems	3-1
Software Engineering	3-0
Computer Networks	3-1
Information Security	3-0
Final Year Project	0-6
Total	39 (27-12)

General Education Courses

Course Title	Credit hours
English Composition & Comprehension	3
Technical & Business Writing	3
Communication & Presentation Skills	3
Professional Practices	3
Intro to Info. & Comm. Technologies	2-1
Pakistan Studies	2
Islamic Studies/ Ethics	2
Total	18-1

University Elective Courses

(Not limited to the list below, Universities may add more courses)

Course Title	Credit hours
Foreign Language	2-0
Social Service	1-0
Management Related	3-0
Social Science Related	3-0
Economy Related	3-0
Professional Internship	0-3
Total	12-0

Mathematics and Science Foundation Courses

Course Title	Credit hours
Calculus & Analytical Geometry	3-0
Probability & Statistics	3-0
Linear Algebra	3-0
Applied Physics	3-0
Total	12-0

Domain Courses for BS (COMPUTER SCIENCE)

Computer Science CORE (Compulsory) courses

Course Title	Credit hours
Compiler Construction	3-0
Comp. Organization & Assembly Language	3-1
Digital Logic Design	3-1
Design & Analysis of Algorithms	3-0
Parallel & Distributed Computing	3-0
Artificial Intelligence	3-1
Theory of Automata	3-0
Total	24 (21-3)

Computer Science SUPPORTING courses (ANY 3 from following list)

Coverage of relevant pre-requisite must be ensured while offering any of the following courses from this category

Course Title	Credit hours
Differential Equations	3-0
Multi-variate Calculus	3-0
Graph Theory	3-0
Theory of Programming Languages	3-0
Numerical Computing	3-0
Total (Any three of the above)	9-0

Computer Science ELECTIVE courses

Course Title	Credit hours
CS Elective – 1	3
CS Elective – 2	3
CS Elective – 3	3
CS Elective – 4	3
CS Elective – 5	3
Total	15

Approved Study Plan for BS (Computer Science)

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

Semester - I

Code	Course Title	Credit Hours	Pre-requisite
CSC 101	Introduction to ICT	2-1	
CSC 103	Programming Fundamentals	3-1	
HUM 101	English Composition & Comprehension	3-0	
MAT 101	Calculus & Analytical Geometry	3-0	
NSC 101	Applied Physics	2-1	
HUM 103	Islamic Studies / Ethics	2-0	
Total		16-3	

Semester - II

Code	Course Title	Credit Hours	Pre-requisite
CSC 102	Digital Logic Design	3-1	Applied Physics
CSC 104	Object Oriented Programming	3-1	Programming Fundamentals
HUM 102	Communication & Presentation Skills	3-0	English Composition & Comprehension
MAT 102	Probability & Statistics	3-0	
UNE 1xx	University Elective - I	2-0	
HUM 104	Pakistan Studies	2-0	
Total		16-2	

Semester - III

Code	Course Title	Credit Hours	Pre-requisite
CSC 201	Comp Organization & Assembly Lang.	3-1	
CSC 203	Data Structures & Algorithms	3-1	Object-Oriented Programming
CSC 205	Discrete Structures	3-0	
HUM 201	Technical & Business Writing	3-0	
CSS 201	Differential Equations	3-0	
Total		15-2	

Semester - IV

Code	Course Title	Credit Hours	Pre-requisite
CSC 202	Design & Analysis of Algorithms	3-0	Data Structures & Algorithms
CSC 204	Theory of Automata	3-0	
CSC 206	Database Systems	3-1	Data Structures & Algorithms
MAT 202	Linear Algebra	3-0	
UNE 2xx	University Elective - II	3-0	
Total		15-1	

Semester - V

Code	Course Title	Credit Hours	Pre-requisite
CSC 301	Computer Networks	3-1	
CSS 301	Multi-variate Calculus	3-0	
CSC 303	Operating Systems	3-1	Data Structures and Algorithms
CSC 305	Introduction to Software Engineering	3-0	
CSS 303	CS Elective – 1	3-0	Remark: It is recommended to take Visual Programming as CSE-1
Total		15-2	

Semester – VI

Code	Course Title	Credit Hours	Pre-requisite
CSC 302	Artificial Intelligence	3-1	Discrete Structures
CSC 304	Compiler Construction	3-0	Theory of Automata
CSE 4xx	Numerical Computing	3-0	
CSE 4xx	CS Elective – 2	3-0	
HUM 302	Professional Practices	3-0	
Total		15-1	

Semester - VII

Code	Course Title	Credit Hours	Pre-requisite
CSE 4xx	CS Elective – 3	3-0	
CSE 4xx	CS Elective – 4	3-0	
CSC 401	Final Year Project – I	0-3	
UNE 4xx	University Elective - III	3-0	
CSC 403	Parallel & Distributed Computing	3-0	Operating Systems
Total		12-3	

Semester - VIII

Code	Course Title	Credit Hours	Pre-requisite
CSE 4xx	CS Elective – 5	3-0	
UNE 4xx	University Elective IV	3-0	Remarks: In case of Professional Internship, it could be done during semester breaks of third and fourth year.
CSC 402	Final Year Project – II	0-3	
CSC 404	Information Security	3-0	
Total		9-3	

Total Number of Credit Hours is 130 which fulfill the requirement of HEC and NCEAC for the award of BS degree in Computer Science.

List of Elective Courses for BS (CS)

S. No	Code	Title	Credit Hrs.
1	CSE 401	Computer Graphics	2-1
2	CSE 402	Computer Vision	2-1
3	CSE 403	Digital Image Processing	2-1
4	CSE 404	Digital Signal Processing	3-0
5	CSE 405	Distributed Computing	2-1
6	CSE 406	Data and Network Security	3-0
7	CSE 407	Wireless Networks	2-1
8	CSE 408	Wireless Networks Security	3-0
9	CSE 409	Social Computing	3-0
10	CSE 410	Mobile Application and Development	2-1
11	CSE 411	Web Design and Development	2-1
12	CSE 412	Data Warehousing	2-1
13	CSE 413	Data Mining	2-1
14	CSE 414	Data Science	2-1
15	CSE 415	Expert Systems	3-0
16	CSE 416	Artificial Neural Networks	3-0
17	CSE 417	Fuzzy Logic	3-0
18	CSE 418	Web Engineering	3-0
19	CSE 419	Computational Intelligence	3-0
20	CSE 420	Multi Agent Systems	3-0
21	CSE 421	Machine Learning	3-0
22	CSE 422	Natural Language Processing	3-0
23	CSE 423	Game Development	2-1
24	CSE 424	Software Requirement Engineering	3-0
25	CSE 425	Pattern Recognition	3-0
26	CSE 426	Human Computer Interaction	3-0
27	CSE 427	Multimedia Technologies	3-0
28	CSE 428	Grid and Cloud Computing	3-0
29	CSE 429	Software Project Management	3-0
30	CSE 430	Usability Engineering	3-0
31	CSE 431	Ubiquitous Computing	3-0
32	CSE 432	Software Design and Architecture	3-0
33	CSE 433	Object Oriented Software Engineering	3-0
34	CSE 434	Software Quality Engineering	3-0
35	CSE 435	Mobile Communication and Networks	3-0
36	CSE 436	Intelligent and Active Networks	3-0
37	CSE 437	Network Modeling and Simulation	2-1

38	CSE 438	Speech Processing	3-0
39	CSE 439	Speaker and Speech Recognition	3-0
40	CSE 440	Robotics	2-1
41	CSE 441	Design of Intelligent Systems	3-0
42	CSE 442	Virtual Reality	2-1
43	CSE 443	Modeling and Simulation	2-1
44	CSE 444	Big Data Analytics	2-1
45	CSE-445	Fiber Optics Communication	3-0
46	CSE-446	Introduction to Information Systems	3-0
47	CSE-447	Knowledge Management	3-0
48	CSE-448	Introduction to Enterprise Architecture	3-0
49	CSE-449	Assistive Technologies	2-1
50	CSE-450	Research Approaches in Disaster Management	3-0
51	CSE-451	Enterprise Resource Planning	3-0
52	CSE-452	Geographic Information System and Remote Sensing in Disasters Management	2-1