

Scheme of Study for Associate Degree of Sciences in Computer Science ADS(CS)
for the Affiliated Colleges of BZU
2-Year program (4 Regular Semesters of 18 weeks each)
(w.e.f: Fall 2023)

Areas	Domain	Credit Hours	No. of Courses
Computing Core	Core	33	10
Computing Elective	Elective	06	2
Mathematics & Supporting Courses	Maths	03	1
General Education Requirement	GER	30	12
Totals		72	25

*: **Non-credit “Zero Mathematics”** course is introduced in compliance with NCEAC policy for those students who have not included mathematics in their intermediate studies. It is mandatory for those students to pass non-credit “Zero Mathematics” (intermediate) within 1st year of BS(CS) to confirm their admission, otherwise their admission shall stand cancelled.

Semester – 1

#	Course Code	Pre-Reqs	Course Title	Domain	Cr Hrs (Cont Hrs)
1	CS 101		Programming Fundamentals	Core	4 (3-3)
2	GE 101		Application of information & Communication Technologies	GER	3 (2-3)
3	GE 103		Quantitative Reasoning (Discrete Structures)	GER	3 (3-0)
4	GE 105		Functional English	GER	3 (3-0)
5	GE 107		Islamic Studies	GER	2 (2-0)
6	MT 103		Linear Algebra	Maths	3 (3-0)
7	ARAB 151		<i>Nazra Holy Quran</i>	<i>Non-Cr.</i>	<i>1 (1 -0)</i>
8	MT 101		<i>Zero Mathematics*</i>	<i>Non-Cr.</i>	<i>3 (3 -0)</i>
Total Cr. Hrs.					18 (16-6)

Semester – 2

#	Course Code	Pre-Reqs	Course Title	Domain	Cr Hrs (Cont Hrs)
1	CS 102	PF	Object Oriented Programming	Core	4 (3-3)
2	CS 104		Database Systems	Core	4 (3-3)
3	CS 106		Digital Logic Design	Core	3 (2-3)
4	GE 102		Expository Writing	GER	3 (3-0)
5	GE 104		Quantitative Reasoning (Calculus and Analytic Geometry)	GER	3 (3-0)
6	GE 106		Ideology and Constitution of Pakistan	GER	2 (2-0)
7	ARAB 152		<i>Nazra Holy Quran</i>	<i>Non-Cr.</i>	<i>1 (1 -0)</i>
8	MT 102		<i>Zero Mathematics*</i>	<i>Non-Cr.</i>	<i>3 (3 -0)</i>
Total Cr. Hrs.					19 (16-9)

Semester – 3

#	Course Code	Pre-Reqs	Course Title	Domain	Cr Hrs (Cont Hrs)
1	CS 201	PF	Data Structures	Core	4 (3-3)
2	CS 203		Computer Networks	Core	3 (2-3)
3	CS 205		Software Engineering	Core	3 (3-0)
4	CS 209	PF	Advanced Programming Language – Visual Programming	Elective	3 (2-3)
5	GE 201		Natural Sciences (Applied Physics)	GER	3 (2-3)
6	GE 203		Civics and Community Engagement	GER	2 (2-0)
7	ARAB 251		<i>Nazra Holy Quran</i>	<i>Non-Cr.</i>	<i>1 (1 -0)</i>
				Total Cr. Hrs.	18 (14-12)

Semester – 4

#	Course Code	Pre-Reqs	Course Title	Domain	Cr Hrs (Cont Hrs)
1	CS 202	DLD	Computer Organization and Assembly Language	Core	3 (2-3)
2	CS 202		Web Technologies	Elective	3 (2-3)
3	CS 204		Artificial Intelligence	Core	2 (2-0)
4	CS 206		Information Security	Core	3 (2-3)
5	GE 202		Entrepreneurship	GER	2 (2-0)
6	GE 204		Social Science (Economics)	GER	2 (2-0)
7	GE 206		Arts and Humanities (Professional Practices)	GER	2 (2-0)
8	ARAB 252		<i>Nazra Holy Quran</i>	<i>Non-Cr.</i>	<i>1 (1 -0)</i>
				Total Cr. Hrs.	17 (14-09)

CS Elective Courses

#	Category	Course Title	Cr Hrs (Cont Hrs)	Prerequisites
1	CS-Elec	Advanced Database Management Systems	3(2-3)	Database Systems
2	CS-Elec	Advanced Digital Logic Design	3(2-3)	Digital Logic Design
3	CS-Elec	Advanced Statistics	3(2-3)	Statistics
4	CS-Elec	Agent Based Modeling	3(2-3)	
5	CS-Elec	Analysis of Information Systems	3(2-3)	Information Security
6	CS-Elec	Android Programming	3(2-3)	
7	CS-Elec	Art for Games	3(2-3)	
8	CS-Elec	Artificial Neural Networks	3(2-3)	Discrete Structures
9	CS-Elec	Artificial Neural Networks & Deep Learning	3(2-3)	Discrete Structures
10	CS-Elec	Big Data Analytics	3(2-3)	Data Mining/Data Science
11	CS-Elec	Business Process Analysis	3(2-3)	Software Engineering
12	CS-Elec	Cloud Computing	3(2-3)	
13	CS-Elec	Computer Graphics	3(2-3)	Programming Fundamentals
14	CS-Elec	Computer Vision	3(2-3)	
15	CS-Elec	Computational Intelligence	3(2-3)	Discrete Structures
16	CS-Elec	Cryptanalysis	3(2-3)	
17	CS-Elec	Cyber Law & Cyber Crime (Cyber Warfare)	3(2-3)	Cyber Security
18	CS-Elec	Cyber Security	3(2-3)	
19	CS-Elec	Cyber Security Lab	3(1-6)	
20	CS-Elec	Data Mining	3(2-3)	Database Systems
21	CS-Elec	Data Science	3(2-3)	Database Systems
22	CS-Elec	Data Visualization	3(2-3)	Database Systems
23	CS-Elec	Data Warehousing	3(2-3)	Database Systems
24	CS-Elec	Data Warehousing & Business Intelligence	3(2-3)	Database Systems
25	CS-Elec	DB Administration & Management	3(2-3)	Database Systems
26	CS-Elec	Deep Learning	3(2-3)	
27	CS-Elec	Digital Forensics	3(2-3)	
28	CS-Elec	Digital Image Processing	3(2-3)	Data Structures & Algorithm
29	CS-Elec	Digital Signal Processing	3(2-3)	
30	CS-Elec	Digital System Design	3(2-3)	
31	CS-Elec	Distributed Computing	3(2-3)	Operating Systems
32	CS-Elec	Distributed Database Systems	3(2-3)	Intro. to Database Systems
33	CS-Elec	Ethical Hacking	3(2-3)	
34	CS-Elec	Embedded Systems	3(2-3)	
35	CS-Elec	Embedded Systems Security	3(2-3)	
36	CS-Elec	Evolutionary Computing	3(2-3)	
37	CS-Elec	Expert Systems	3(2-3)	Discrete Structures
38	CS-Elec	Formal Methods in Software Engineering	3(2-3)	Discrete Structures
39	CS-Elec	Fuzzy Logic Systems	3(2-3)	Discrete Structures
40	CS-Elec	Game Design and Development	3(2-3)	Object-Oriented Programming
41	CS-Elec	Game Programming	3(2-3)	
42	CS-Elec	Game Project Management	3(2-3)	
43	CS-Elec	HCI & Computer Graphics	3(2-3)	
44	CS-Elec	Information Assurance	3(2-3)	

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45	CS-Elec	Information System Security	3(2-3)	
46	CS-Elec	Information System Theory	3(2-3)	
47	CS-Elec	Information Technology Infrastructure	3(2-3)	
48	CS-Elec	Interactive Games and Audio	3(2-3)	
49	CS-Elec	Introduction to Data Science	3(2-3)	
50	CS-Elec	Java Programming	3(2-3)	Programming Fundamentals
51	CS-Elec	Knowledge Based Systems	3(2-3)	
52	CS-Elec	Knowledge Representation & Reasoning	3(2-3)	
53	CS-Elec	Logical Paradigms of Computing	3(2-3)	Discrete Structures
54	CS-Elec	Machine Learning	3(2-3)	
55	CS-Elec	Malware Analysis	3(2-3)	
56	CS-Elec	Management of Information Systems	3(2-3)	
57	CS-Elec	Mobile Application Development - I	3(2-3)	Programming Fundamentals
58	CS-Elec	Mobile Application Development - II	3(2-3)	Mobile Application Development - I
59	CS-Elec	Mobile Application Development Lab	3(2-3)	
60	CS-Elec	Mobile Computing	3(2-3)	Data Comm. & Networks
61	CS-Elec	Mobile Games & Entertainment	3(2-3)	
62	CS-Elec	Mobile Multimedia	3(2-3)	
63	CS-Elec	Multi-Agent Systems	3(2-3)	Data Comm. & Networks
64	CS-Elec	Multicore & GPU Programming	3(2-3)	
65	CS-Elec	Natural Language Processing	3(2-3)	
66	CS-Elec	Network Programming	3(2-3)	Data Comm. & Networks
67	CS-Elec	Network Security	3(2-3)	Data Comm. & Networks
68	CS-Elec	Numerical Analysis	3(2-3)	
69	CS-Elec	Object Oriented Analysis & Design	3(2-3)	Software Engineering
70	CS-Elec	Operations Research	3(2-3)	
71	CS-Elec	Parallel & Distributed Computing	3(2-3)	
72	CS-Elec	Parallel Computer Architectures	3(2-3)	
73	CS-Elec	Penetration Testing	3(2-3)	
74	CS-Elec	Platforms & Architectures for Data Science	3(2-3)	
75	CS-Elec	Principles of Programming Languages	3(2-3)	Programming Fundamentals
76	CS-Elec	Programming for 3D & Web 3D Apps	3(2-3)	
77	CS-Elec	Programming for AI	3(2-3)	
78	CS-Elec	Project Management	3(2-3)	
79	CS-Elec	Reinforcement Learning	3(2-3)	
80	CS-Elec	Secure Software Design and Development	3(2-3)	
81	CS-Elec	Semantic Web Technologies	3(2-3)	
82	CS-Elec	Service and Operation Management	3(2-3)	
83	CS-Elec	Social Computing	3(2-3)	
84	CS-Elec	Software Construction & Development	3(2-3)	Software Engineering
85	CS-Elec	Software Design & Architecture	3(2-3)	Software Engineering
86	CS-Elec	Software Project Management	3(2-3)	Software Engineering
87	CS-Elec	Software Quality Engineering	3(2-3)	Software Engineering
88	CS-Elec	Software Re-Engineering	3(2-3)	Software Engineering
89	CS-Elec	Software Requirement Engineering	3(2-3)	Software Engineering
90	CS-Elec	Software Testing & Quality Assurance	3(2-3)	Software Engineering

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91	CS-Elec	Software Verification and Validation (Testing & QA)	3(2-3)	Software Engineering
92	CS-Elec	Speech Processing	3(2-3)	
93	CS-Elec	Swarm Intelligence	3(2-3)	
94	CS-Elec	System & Network Administration	3(2-3)	
95	CS-Elec	System Analysis	3(2-3)	
96	CS-Elec	Systems Programming	3(2-3)	Operating Systems
97	CS-Elec	Telecommunication Systems	3(2-3)	Data Comm. & Networks
98	CS-Elec	Text Mining	3(2-3)	
99	CS-Elec	Topics in Data Science	3(2-3)	
100	CS-Elec	Video Games & Creative Writing	3(2-3)	
101	CS-Elec	Video Production Techniques	3(2-3)	
102	CS-Elec	Virtual Systems & Services	3(2-3)	
103	CS-Elec	Visual Programming	3(2-3)	Programming Fundamentals
104	CS-Elec	Visual Programming Lab	3(1-6)	Programming Fundamentals
105	CS-Elec	Vulnerability Assessment & Reverse Engineering	3(2-3)	
106	CS-Elec	Wireless and Mobile Security	3(2-3)	
107	CS-Elec	Web Applications and Services	3(2-3)	
108	CS-Elec	Web Design and Development	3(2-3)	Programming Fundamentals
109	CS-Elec	Web Engineering	3(2-3)	Programming Fundamentals
110	CS-Elec	Wireless Networks	3(2-3)	Data Comm. & Networks
111	CS-Elec	Web Technologies	3(2-3)	Programming Fundamentals
112	CS-Elec	Web Technologies Lab	3(1-6)	Programming Fundamentals

General Education & Mathematics Courses

#	Category	Course Title	Cr Hrs (Cont Hrs.)	Prerequisites
1	Maths	Multivariable Calculus	3(3-0)	
2	Maths	Differential Equations	3(3-0)	
3	Maths	Linear Algebra	3(3-0)	
4	Maths	Probability & Statistics	3(3-0)	
5	English	Functional English	3(3-0)	
6	English	Expository Writing	3(3-0)	
7	English	Technical & Business Writing	3(3-0)	
8	English	English Composition & Comprehension	3(3-0)	
9	English	Communication & Presentation Skills	3(3-0)	
10	Quantitative Reasoning	Discrete Structures	3(3-0)	
11	Quantitative Reasoning	Calculus and Analytic Geometry	3(3-0)	
12	General Education	Islamic Studies	2(2-0)	
13	General Education	Ideology and Constitution of Pakistan	2(2-0)	
14	General Education	Civics and Community Engagement	2(2-0)	
15	General Education	Application of Information & Communication Technologies	3(2-3)	
16	General Education	Entrepreneurship	2(2-0)	
17	Art & Humanities	Professional Practices	2(2-0)	

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18	Art & Humanities	Foreign/Regional Languages (French, German, Chinese, Japanese, Russian, Sindhi, Punjabi, Balochi, Pashto etc.)	2(2-0)	
19	Natural Science	Applied Physics	3(2-1)	
20	Natural Science	Basic Electronics	3(2-1)	
21	Social Science	Economics	2(2-0)	
22	Social Science	Introduction to Management	2(2-0)	
23	Social Science	Introduction to Marketing	2(2-0)	
24	Social Science	Human Resource Management	2(2-0)	
25	Social Science	Philosophy	2(2-0)	
26	Social Science	Psychology	2(2-0)	
27	Social Science	International Relations	2(2-0)	
28	Social Science	Financial Accounting	3(3-0)	
29	Social Science	Financial Management	3(3-0)	