

COMSATS University Islamabad
Registrar Office, Principal Seat, Islamabad

Scheme of Studies of Bachelor of Science in Computer Science for Fall 2023

- 1. Minimum Duration:** 04 Years Years
- 2. Minimum Semesters:** 08
- 2. Maximum Duration:** 0 Years
- 4. Maximum Semesters:** 0 Years

Course Work	<u>Min No. of Courses</u>		<u>Min No. of Credit Hrs</u>
1 a. General Education Courses:	12		30
2 i. Computing Core (Mandatory courses)	12		40
3 b. Majors			
	(Min No. of Courses)	(Min No. of Credit Hrs)	
1. i. Computing Core (Mandatory courses)	12	40	0
2. ii. Domain Core (Mandatory courses)	06	18	
3. iii. Domain Elective (any Seven courses from the following list)	07	21	
4 ii. Domain Core (Mandatory courses)	06		18
5 iii. Domain Elective (any Seven courses from the following list)	07		21
6 c. Interdisciplinary/Allied Courses:	05		15
7 d. Field Experience/Internship:	01		03
8 e. Capstone Project	02		06

Total No. of Courses of the Program: 45

Total No. of Credit Hours of the Program: 133

Note:

Common policies and procedures notified vide No. CUI-Reg/Notif-1794/23/1884,dated August 25, 2023 relating to Undergraduate Degree Programs approved by the Competent Authority and amended from time to time shall be applicable.

5. Capstone Project

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
1	CSC498	Final Year Project I	2(0, 2)		CSC241 ,CSC270 ,CSC291
2	CSC499	Final Year Project II	4(0, 4)		CSC498

Application of Information and Communication Technologies (Mandatory course) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
3	CSC101	Applications of Information and Communication Technologies	3(2, 1)		

Arts and Humanities (any one Course from the following list) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
4	ADA111	History and Theory of Art and Culture I	2(2, 0)		
5	ARC108	Art Appreciation	2(2, 0)		
6	ARC351	Calligraphic Arts	2(2, 0)		
7	CSC210	Professional Practices	2(2, 0)		
8	HUM310	Islamic History	2(2, 0)		

B. List of Interdisciplinary Courses (Mandatory courses) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
9	HUM121	Technical and Business Writing	3(3, 0)		
10	MTH105	Multivariable Calculus	3(3, 0)		MTH104
11	MTH231	Linear Algebra	3(3, 0)		
12	MTH262	Statistics and Probability Theory	3(3, 0)		

Civics and Community Engagement (Mandatory course) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
13	HUM208	Civics and Community Engagement	2(2, 0)		

Deficiency Courses (only for Pre-Medical Students) /

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
14	MTH091	Pre-Calculus I	3(3, 0)		
15	MTH092	Pre-Calculus II	3(3, 0)		

Entrepreneurship (Mandatory course) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
16	MGT250	Introduction to Entrepreneurship	2(2, 0)		

Expository Writing (Mandatory Course) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
17	HUM120	Expository Writing	3(3, 0)		

Functional English (Mandatory Course) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
18	HUM104	Functional English	3(3, 0)		

i. Computing Core (Mandatory courses) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
19	CSC103	Programming Fundamentals	4(3, 1)		
20	CSC211	Data Structures	4(3, 1)		CSC103
21	CSC232	Information Security	3(2, 1)		
22	CSC241	Object Oriented Programming	4(3, 1)		CSC103
23	CSC262	Artificial Intelligence	3(2, 1)		
24	CSC270	Database Systems	4(3, 1)		
25	CSC275	Computer Networks	3(2, 1)		
26	CSC291	Software Engineering	3(3, 0)		
27	CSC301	Design and Analysis of Algorithms	3(3, 0)		CSC211
28	CSC323	Operating Systems	3(2, 1)		
29	CSC325	Computer Organization and Assembly Language	3(2, 1)		EEE240
30	EEE240	Fundamentals of Digital Logic Design	3(2, 1)		

Ideology and Constitution of Pakistan (Mandatory course) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
31	HUM113	Ideology and Constitution of Pakistan	2(2, 0)		
ii. Domain Core (Mandatory courses) :					
	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
32	CSC312	Theory of Automata	3(3, 0)		
33	CSC316	Advance Database Systems	3(2, 1)		CSC270
34	CSC334	Parallel and Distributed Computing	3(2, 1)		CSC323
35	CSC365	HCI and Computer Graphics	3(2, 1)		
36	CSC441	Compiler Construction	3(2, 1)		CSC312
37	EEE341	Introduction to Computer Architecture	3(2, 1)		EEE240
iii. Domain Elective (any Seven courses from the following list)					
	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
38	AIC270	Programming for Artificial Intelligence	3(2, 1)		CSC262
39	AIC341	Introduction to Computer Vision	3(2, 1)		
40	AIC354	Machine Learning Fundamentals	3(2, 1)		
41	AIC365	Natural Language Processing	3(2, 1)		
42	AIC380	Artificial Neural Networks and Deep Learning	3(2, 1)		CSC262
43	AIC470	Knowledge Based Systems	3(2, 1)		
44	CSC303	Mobile Application Development	3(2, 1)		CSC241
45	CSC331	Digital Image Processing	3(2, 1)		
46	CSC335	Game Design	3(3, 0)		
47	CSC336	Web Technologies	3(2, 1)		CSC241
48	CSC337	Advanced Web Technologies	3(2, 1)		CSC336
49	CSC350	*Topics in Computer Science I	3(3, 0)		
50	CSC353	Computer Graphics	3(2, 1)		
51	CSC362	Video Production Techniques	3(2, 1)		
52	CSC367	Mobile Games and Entertainment	3(2, 1)		
53	CSC381	Blockchain Technology	3(3, 0)		
54	CSC387	Software Testing and Quality Assurance	3(2, 1)		
55	CSC412	Advanced Programming	3(2, 1)		CSC241
56	CSC417	E-Commerce and Digital Marketing	3(2, 1)		

57	CSC418	DevOps for Cloud Computing	3(2, 1)		
58	CSC421	Robotics	3(3, 0)		
59	CSC454	Pattern Recognition	3(3, 0)		
60	CSC471	Distributed Database Systems	3(3, 0)		CSC270
61	CSC475	Numerical Computing	3(3, 0)		
62	CSC483	Topics in Computer Science II	3(3, 0)		
63	CSC495	Game Development	3(2, 1)		CSC241
64	CSC496	Game Engine Development	3(2, 1)		CSC495
65	CSE305	Software Requirement Engineering	3(3, 0)		CSC291
66	CSE354	Design Patterns	3(2, 1)		
67	CSE494	Software Project Management	3(2, 1)		CSC291
68	CYC205	Introduction to Cyber Security	3(2, 1)		
69	CYC303	Digital Forensics	3(2, 1)		
70	CYC307	Information Assurance	3(3, 0)		
71	CYC365	Network Security	3(2, 1)		CSC275
72	DSC293	Data Science Fundamentals	3(2, 1)		
73	DSC306	Data Mining	3(2, 1)		
74	DSC327	Data Visualization Techniques	3(2, 1)		
75	DSC354	Data Warehousing and Business Intelligence	3(2, 1)		CSC270
76	DSC407	Platform and Architecture for Data Science	3(3, 0)		
77	DSC415	Big Data Analytics	3(2, 1)		DSC306

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Internship (Mandatory courses) /					
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	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
78	CSC395	Field Experience/Internship	3(0, 3)		

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Islamic Studies (Mandatory course. HUM116 Ethics is only for Non-Muslims Students) :					
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	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
79	HUM112	Islamic Studies	2(2, 0)		
80	HUM116	Ethics	2(2, 0)		

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List of Supporting Elective Courses (Any one course for Supporting Elective Courses) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
81	ECO484	Project Planning and Monitoring	3(3, 0)		
82	HUM220	Introduction to Psychology	3(3, 0)		
83	HUM221	International Relations	3(3, 0)		
84	HUM430	French	3(3, 0)		
85	HUM431	German	3(3, 0)		
86	HUM432	Arabic	3(3, 0)		
87	HUM434	Chinese	3(3, 0)		
88	MGT131	Financial Accounting	3(3, 0)		
89	MGT210	Fundamentals of Marketing	3(3, 0)		
90	MGT350	Human Resource Management	3(3, 0)		
91	MGT513	New Product Development	3(3, 0)		

Natural Sciences (any one course from the following list) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
92	BIO100	Fundamentals of Biology	3(2, 1)		
93	BIO310	Introduction to Bioinformatics	3(2, 1)		
94	BIO321	Fundamentals of Genetics	3(2, 1)		
95	CHM100	Introduction to Chemistry	3(2, 1)		
96	PHY124	Applied Physics	3(2, 1)		

Quantitative Reasoning (any two courses from the following list) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
97	CSC102	Discrete Structures	3(3, 0)		
98	MTH103	Exploring Quantitative Skills	3(3, 0)		
99	MTH104	Calculus and Analytic Geometry	3(3, 0)		
100	MTH114	Tools for Quantitative Reasoning	3(3, 0)		

Social Sciences (any one course from the following list) :

	Course Code	Course Title	Credit Hours	Co-requisite(s)	Prerequisite (s)
101	HUM122	Fundamentals of Psychology	2(2, 0)		
102	HUM130	Fundamentals of Sociology	2(2, 0)		
103	HUM131	Anthropology	2(2, 0)		
104	HUM209	Fundamentals of Political Science	2(2, 0)		
105	HUM222	Fundamentals of International Relations	2(2, 0)		

Note:

1. ** Non-Muslim students can opt for HUM114 Ethics 3(3, 0) course in lieu of HUM110 Islamic Studies, if they intend to. 2. In order to specialize in a particular track, student must select at least 3 courses from that track. CSC350 and CSC483 (Category of General Computer Science Electives) can be part of any track. 3. CSC350-Topics in Computer Science I and CSC483-Topics in Computer Science II may be allowed to offer upon getting prior approval of the contents of these courses from the Head of Department (HoD). 4. Deficiency Courses (Non-Credit). Students with Pre-Medical background at Intermediate level have to pass deficiency courses i.e., of MTH091 (Pre-Calculus I) and MTH092 (Pre-Calculus II)

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Note:

1. Natural Sciences (1 course, 3 credit hours - 2 theory credit hours + 1 lab credit hour): This course falls under the Natural Sciences category and carries 3 credit hours. It usually consists of 2 credit hours of theory and 1 credit hour of laboratory work. The course may cover subjects like biology, chemistry, physics, or environmental sciences.
2. Social Sciences (1 course, 2 credit hours): This course is categorized under Social Sciences and carries 2 credit hours. It may include subjects like sociology, psychology, anthropology, economics, or political science.
3. Functional English (1 course, 3 credit hours): The Functional English course is designed to improve students' practical language skills and carries 3 credit hours.
4. Expository Writing (1 course, 3 credit hours): Expository Writing aims to enhance students' writing abilities, particularly in producing clear and informative essays. The course carries 3 credit hours.
5. Quantitative Reasoning (2 courses, 6 credit hours): This category consists of two courses, each carrying 3 credit hours, focusing on developing students' quantitative and mathematical reasoning skills.
6. Islamic Studies (OR) Religious Education/Ethics for non-Muslim students (1 course, 2 credit hours): This course covers Islamic Studies for Muslim students. Alternatively, non-Muslim students can take Religious Education or Ethics instead. The course carries 2 credit hours.
7. Ideology and Constitution of Pakistan (1 course, 2 credit hours): This course explores the ideology and constitution of Pakistan and carries 2 credit hours.
8. Applications of Information and Communication Technologies (ICT) (1 course, 3 credit hours - 2 theory hours + 1 lab hour): This course focuses on the practical applications of ICT and carries 3 credit hours, with 2 hours dedicated to theory and 1 hour to lab work.
9. Entrepreneurship (1 course, 2 credit hours): This course aims to teach students about entrepreneurship and carries 2 credit hours.
10. Civics and Community Engagement (1 course, 2 credit hours): This course covers civics and community engagement topics and carries 2 credit hours.

Associate Degree:

11. Exiting from Undergraduate/Equivalent Degree Program with an Associate Degree: In the undergraduate/equivalent degree program, students have the option to exit and obtain an Associate Degree if they meet specific criteria. To qualify, students must have completed at least 60 credit hours, including 30 credit hours of general education courses, over a minimum of four semesters, while maintaining a minimum CGPA of 2.00/4.00. The subject field on the degree must remain the same as initially enrolled, and approval for the exit option is granted by the Rector based on the Head of the Department's recommendations. However, this option is not available for disciplines accredited by certain councils like PM&DC, PNC, PVMC, PEC, PCP, PCATP, PBC, NTC, NCT, NAEAC, NCH, etc. On the other hand, disciplines accredited by councils such as NCEAC, NBEAC, and NACTE allow students to pursue the Associate Degree option.
12. Credit Hours: To qualify for the Associate Degree, the standard range of credit hours is 60-72.

13. General Education Courses: All Associate Degree programs must include a mandatory set of 30 credit hours for general education courses.
14. Major Courses: Associate Degree programs shall consist of a mandatory set of 30-42 credit hours for major or disciplinary courses.
15. Field Experience/Internship: If prescribed by the respective Accreditation Council, National Curriculum Review Committee, or the university, a field experience or internship of six to eight weeks must be completed and graded by a faculty member in collaboration with the field supervisor appointed by HoD. This requirement carries 3 credit hours, and if applicable, the courses within the major will comprise 30-39 credit hours.
16. CGPA Requirement: The minimum CGPA required for the award of the Associate Degree program is 2.00/4.00.
17. The pathway for Associate Degree holders allows direct admission to the fifth semester in the same discipline without deficiency courses. However, if the disciplines differ, students must complete deficiency courses in a bridging semester before the fifth semester, as determined by the university's concerned department. Short-listed candidates will undergo a deficiency semester to complete required courses in the relevant discipline before entering the 5th semester of their respective BS programs at CUI. The deficiency courses will be determined by the Dean, recommended by the HoD and Chairman, based on the students' profiles. The relevancy of the previous degree will also be determined by the respective Dean, recommended by the HoD and Chairman on a case-by-case basis, and the decision will be notified and documented in the student's file by the respective campus registrar office. Candidates will also be informed by the respective campus registrar office about their deficiency course/semester before the start of the semester. The minimum eligibility for admission to the fifth semester is a CGPA of 2.00/4.00 or 1st Division in the prior qualification, i.e., the Associate Degree. They are also required to submit NTS-NAT test scores as per CUI policy. All other terms and conditions of CUI, as well as those of relevant Accreditation Councils/Professional Bodies, if any, apply as amended from time to time.
18. Pathway for Conventional Two-Year BA/BSc/Equivalent Degree Holders: Students who completed conventional two-year BA/BSc/equivalent degree programs can join the fifth semester of an undergraduate/equivalent degree program. However, they need to complete deficiency courses through a bridging semester before starting the fifth semester, as determined by the university. The minimum eligibility for admission to the fifth semester in this case is 50% marks in the prior qualification, i.e., conventional two-year BA/BSc/equivalent degree programs. They are also required to submit NTS-NAT test scores as per CUI policy. All other terms and conditions of CUI, as well as those of relevant Accreditation Councils/Professional Bodies, if any, apply as amended from time to time.

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