

Scheme of Studies

Faculty of Computing and Artificial Intelligence
Department of Creative Technologies
Bachelor of Science in Artificial Intelligence
(Applicable from Fall-2023 Intake & Onwards)

Framework of BSAI Program

Area	Category	Course Code & Title	Cr. Hrs.	%
Computing	Computing Core	CS111 Programming Fundamentals	3-0-3	~61.4
		CS111L Programming Fundamentals Lab	0-1-1	
		CS112 Object Oriented Programming	3-0-3	
		CS112L Object Oriented Programming Lab	0-1-1	
		CS130 Database Systems	3-0-3	
		CS130L Database Systems Lab	0-1-1	
		EE123 Digital Logic Design	2-0-2	
		EE123L Digital Logic Design Lab	0-1-1	
		CS216 Data Structures	3-0-3	
		CS216L Data Structures Lab	0-1-1	
		CS215 Information Security	2-0-2	
		CS215L Information Security Lab	0-1-1	
		AI232 Introduction to Artificial Intelligence	2-0-2	
		AI232L Introduction to Artificial Intelligence Lab	0-1-1	
		CS260 Computer Networks	2-0-2	
		CS260L Computer Networks Lab	0-1-1	
		SE101 Introduction to Software Engineering	3-0-3	
		CS226 Computer Organization and Assembly Language	2-0-2	
		CS226L Computer Organization and Assembly Language Lab	0-1-1	
		CS325 Operating Systems	2-0-2	
		CS325L Operating Systems Lab	0-1-1	
		CS332 Design and Analysis of Algorithms	3-0-3	
		AI497 Final Year Project – I	0-1-1	
		AI498 Final Year Project – II	0-2-2	
		AI499 Final Year Project - III	0-3-3	
	Domain Core	AI230 Programming for Artificial Intelligence	2-0-2	
		AI230L Programming for Artificial Intelligence	0-1-1	
		AI233 Machine Learning	2-0-2	
		AI233L Machine Learning Lab	0-1-1	
		AI335 Deep Learning	2-0-2	
		AI335L Deep Learning Lab	0-1-1	
		AI321 Knowledge Representation and Reasoning	2-0-2	

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		AI321L	Knowledge Representation and Reasoning Lab	0-1-1	
		AI303	Computer Vision	2-0-2	
		AI303L	Computer Vision Lab	0-1-1	
		CS426	Parallel and Distributed Computing	2-0-2	
		CS426L	Parallel and Distributed Computing Lab	0-1-1	
	Domain Elective	AIXXX	AI Elective – I	2-0-2	
		AIXXXL	AI Elective – I Lab	0-1-1	
		AIXXX	AI Elective – II	2-0-2	
		AIXXXL	AI Elective – II Lab	0-1-1	
		AIXXX	AI Elective – III	2-0-2	
		AIXXXL	AI Elective – III Lab	0-1-1	
		AIXXX	AI Elective – IV	2-0-2	
		AIXXXL	AI Elective – IV Lab	0-1-1	
		AIXXX	AI Elective – V	2-0-2	
		AIXXXL	AI Elective – V Lab	0-1-1	
		AIXXX	AI Elective – VI	2-0-2	
		AIXXXL	AI Elective – VI Lab	0-1-1	
		AIXXX	AI Elective – VII	2-0-2	
		AIXXXL	AI Elective – VII Lab	0-1-1	
Total	Number of Computing Core Courses: *14		Cr. Hrs. : 46 (30-16)		
	Number of Domain Core Courses: 06		Cr. Hrs. : 18 (12-6)		
	Number of Domain Elective Courses: 07		Cr. Hrs. : 21 (14-7)		
	Number of Computing Courses: 27		Cr. Hrs. : 85 (56-29)		
	* Note: FYP-I, FYP-II, and FYP-III are considered two rather than three courses.				
Non-Computing	Mathematics and Supporting Courses	MA105	Multivariable Calculus	3-0-3	~38.6
		MA201	Linear Algebra	3-0-3	
		MA301	Probability and Statistics	3-0-3	
		EL400	Technical & Business Writing	3-0-3	
	Elective Supporting Courses	XXXXX	Elective Supporting - I	3-0-3	
	General Education Requirement Courses	CS181	Application of Information & Communication Technologies	2-0-2	
		CS181L	Application of Information & Communication Technologies Lab	0-1-1	
		EL170	Functional English	3-0-3	
		EL271	Expository Writing	3-0-3	
		MA216	Quantitative Reasoning -I (Discrete Structures)	3-0-3	
		MA110	Quantitative Reasoning -II (Calculus & Analytical Geometry)	3-0-3	
		HU124	Islamic Studies & Ethics	2-0-2	
		HU405	Ideology and Constitution of Pakistan	2-0-2	

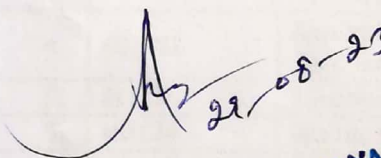
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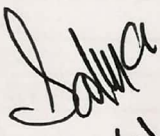
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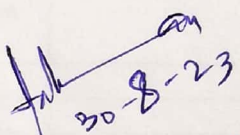
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		BA152	Social Sciences (Introduction to Management)	2-0-2
		PH111	Natural Sciences (Applied Physics)	2-0-2
		PH111L	Natural Sciences (Applied Physics Lab)	0-1-1
		CS470	Arts & Humanities (Professional Practices)	2-0-2
		HU411	Civics and Community Engagement	2-0-2
		BA353	Entrepreneurship	2-0-2
Total	Number of Mathematics and Supporting Courses: 04			Cr. Hrs. : 12 (12-0)
	Number of Elective Supporting Courses: 01			Cr. Hrs. : 3 (3-0)
	Number of General Education Requirement Courses: 12			Cr. Hrs. : 30 (28+2)
	Number of Computing Courses: 17			Cr. Hrs. : 45 (43-2)
Grand Total	Total Number of Courses: 44 + Internship Total Cr. Hrs. : 130 (99-31) + Internship (03) = 133			


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Semester-Wise Scheme of Studies
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Semester I				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	CS111	Programming Fundamentals	-	3-0-3
2.	CS111L	Programming Fundamentals Lab	-	0-1-1
3.	CS181	Application of Information & Communication Technologies	-	2-0-2
4.	CS181L	Application of Information & Communication Technologies Lab	-	0-1-1
5.	EL170	Functional English	-	3-0-3
6.	HU124	Islamic Studies & Ethics	-	2-0-2
7.	PH111	Applied Physics	-	2-0-2
8.	PH111L	Applied Physics Lab	-	0-1-1
9.	*MA114	Foundational Mathematics (Non-Credit for Pre-Medical students only)	-	3-0-3
Total Cr. Hrs.:				12-3-15
Total Contact Hours: 21				

Semester II				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	CS112	Object Oriented Programming	CS111, CS111L	3-0-3
2.	CS112L	Object Oriented Programming Lab	CS111, CS111L	0-1-1
3.	CS130	Database Systems	-	3-0-3
4.	CS130L	Database Systems Lab	-	0-1-1
5.	EE123	Digital Logic Design	-	2-0-2
6.	EE123L	Digital Logic Design Lab	-	0-1-1
7.	SE101	Introduction to Software Engineering	-	3-0-3
8.	MA216	Discrete Structures	-	3-0-3
9.	*MA118	Pre-Calculus (Non-Credit for Pre-Medical Students only)	-	3-0-3
Total Cr. Hrs.:				14-3-17
Total Contact Hours: 23				

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Semester III				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	CS216	Data Structures		
2.	CS216L	Data Structures	CS112, CS112L	3-0-3
3.	AI230	Programming for Artificial Intelligence	CS112, CS112L	0-1-1
4.	AI230L	Programming for Artificial Intelligence Lab	-	2-0-2
5.	CS260	Computer Networks	-	0-1-1
6.	CS260L	Computer Networks Lab	-	2-0-2
7.	MA110	Calculus & Analytical Geometry	-	0-1-1
8.	MA301	Probability and Statistics	-	3-0-3
Total Cr. Hrs.:				3-0-3
Total Contact Hours: 22				13-3-16

Semester IV				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	CS226	Computer Organization and Assembly Language	EE123, EE123L	2-0-2
2.	CS226L	Computer Organization and Assembly Language Lab	EE123, EE123L	0-1-1
3.	AI232	Introduction to Artificial Intelligence	-	2-0-2
4.	AI232L	Introduction to Artificial Intelligence Lab	-	0-1-1
5.	AI233	Machine Learning	-	2-0-2
6.	AI233L	Machine Learning Lab	-	0-1-1
7.	MA105	Multivariable Calculus	MA110	3-0-3
8.	MA201	Linear Algebra	-	3-0-3
9.	AIXXX	Domain Elective - I	-	2-0-2
10.	AIXXXL	Domain Elective - I Lab	-	0-1-1
Total Cr. Hrs.:				14-4-18
Total Contact Hours: 26				

Summer Break		
AI496	*Internship	03 Cr. Hrs.
* Internship Requirement: In order to graduate, every student must complete an internship program of 06 weeks duration, after the completion of their 4th semester, preferably during the summer break. The performance of the students during the internship will be evaluated and graded as a 03 Credit Hours course, and reflected in the transcript. Under exceptional circumstances, a student may be allowed to undertake the internship after 6th semester with the approval of HoD.		

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Semester V				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	CS325	Operating Systems		
2.	CS325L	Operating Systems Lab	-	2-0-2
3.	AI321	Knowledge Representation and Reasoning	-	0-1-1
4.	AI321L	Knowledge Representation and Reasoning Lab	-	2-0-2
5.	AI335	Deep Learning	-	0-1-1
6.	AI335L	Deep Learning Lab	AI233, AI233L	2-0-2
7.	AIXXX	Domain Elective - II	AI233, AI233L	0-1-1
8.	AIXXXL	Domain Elective - II Lab	-	2-0-2
9.	CS332	Design and Analysis of Algorithms	-	0-1-1
10.	EL271	Expository Writing	CS216, CS216L	3-0-3
Total Cr. Hrs.:			EL170	3-0-3
Total Contact Hours: 26				14-4-18

Semester VI				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	AI303	Computer Vision		
2.	AI303L	Computer Vision Lab	-	2-0-2
3.	AIXXX	Domain Elective - III	-	0-1-1
4.	AIXXXL	Domain Elective - III Lab	-	2-0-2
5.	EL400	Technical & Business Writing	-	0-1-1
6.	AIXXX	Domain Elective - IV	-	3-0-3
7.	AIXXXL	Domain Elective - IV Lab	-	2-0-2
8.	AIXXX	Domain Elective - V	-	0-1-1
9.	AIXXXL	Domain Elective - V Lab	-	2-0-2
10.	BA353	Entrepreneurship	-	0-1-1
11.	AI497	Final Year Project - I	-	2-0-2
Total Cr. Hrs.:			List-A	0-1-1
Total Contact Hours: 28				13-5-18

Semester VII				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	AI498	Final Year Project - II	AI497	0-2-2
2.	CS215	Information Security	-	2-0-2
3.	CS215L	Information Security Lab	-	0-1-1
4.	AIXXX	Domain Elective - VI	-	2-0-2
5.	AIXXXL	Domain Elective - VI Lab	-	0-1-1
6.	AIXXX	Domain Elective - VII	-	2-0-2
7.	AIXXXL	Domain Elective - VII Lab	-	0-1-1
8.	CS426	Parallel and Distributed Computing	CS325, CS325L	2-0-2
9.	CS426L	Parallel and Distributed Computing Lab	CS325, CS325L	0-1-1
Total Cr. Hrs.:				8-6-14
Total Contact Hours: 26				

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Semester VIII				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	AI499	Final Year Project - III		
2.	HU405	Ideology and Constitution of Pakistan	AI498	0-3-3
3.	CS470	Professional Practices		2-0-2
4.	HU411	Civics and Community Engagement		2-0-2
5.	XXXXX	Elective Supporting – I		2-0-2
6.	BA152	Introduction to Management		3-0-3
Total Cr. Hrs.:				2-0-2
Total Contact Hours: 20				11-3-14

Program Total Credit Hours: 130 (99-31) + Internship (03) = 133

List-A: Pre-Requisite Courses for Final Year Project - I

S. No.	Course Code	Course Title	Cr Hrs.
1.	CS111	Programming Fundamentals	3-0-3
2.	CS111L	Programming Fundamentals Lab	0-1-1
3.	CS112	Object Oriented Programming	3-0-3
4.	CS112L	Object Oriented Programming Lab	0-1-1
5.	CS216	Data Structures	3-0-3
6.	CS216L	Data Structures Lab	0-1-1
7.	SE101	Introduction to Software Engineering	3-0-3
8.	CS130	Database Systems	3-0-3
9.	CS130L	Database Systems Lab	0-0-1

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List of Domain Elective Courses

Note: A student must study 07 domain elective courses, out of which at least 05 courses must be undertaken from the list given below. A student can undertake 02 domain elective courses from other FCAI departments with the permission of respective HoDs.

S. No.	Course Code	Course Title	Cr. Hrs.
1.	AI234	Human Computer Interaction and AI	2-0-2
	AI234L	Human Computer Interaction and AI Lab	
2.	AI235	Mobile Application Development and AI	2-0-2
	AI235L	Mobile Application Development and AI Lab	
3.	AI236	Web Engineering and AI	2-0-2
	AI236L	Web Engineering and AI Lab	
4.	AI323	Information Retrieval	2-0-2
	AI323L	Information Retrieval Lab	
5.	AI317	Agent Based Systems	2-0-2
	AI317L	Agent Based Systems Lab	
6.	AI307	Biomedical Data Processing and Analysis	2-0-2
	AI307L	Biomedical Data Processing and Analysis Lab	
7.	AI308	Advanced Multimedia Processing	2-0-2
	AI308L	Advanced Multimedia Processing Lab	
8.	AI311	Microcontroller and Embedded Systems	2-0-2
	AI311L	Microcontroller and Embedded Systems Lab	
9.	AI313	Internet of Things and Sensor Networks	2-0-2
	AI313L	Internet of Things and Sensor Networks Lab	
10.	AI314	Ubiquitous Computing and Intelligent Systems	2-0-2
	AI314L	Ubiquitous Computing and Intelligent Systems Lab	
11.	AI315	Artificial Intelligence in Automation	2-0-2
	AI315L	Artificial Intelligence in Automation Lab	
12.	AI316	AI Project Design and Development	2-0-2
	AI316L	AI Project Design and Development Lab	
13.	AI418	Applied AI with Computer Vision	2-0-2
	AI418L	Applied AI with Computer Vision Lab	
14.	AI436	Visual Learning and Recognition	2-0-2
	AI436L	Visual Learning and Recognition Lab	
15.	AI437	Intelligent Video Analytics	2-0-2
	AI437L	Intelligent Video Analytics Lab	
16.	AI318	Expert Systems with Applications	2-0-2
	AI318L	Expert Systems with Applications Lab	
17.	AI322	Knowledge Based Systems	2-0-2
	AI322L	Knowledge Based Systems Lab	
18.	AI324	Natural Language Processing	2-0-2
	AI324L	Natural Language Processing Lab	
19.	AI325	Computational Linguistics and Text Analytics	2-0-2
	AI325L	Computational Linguistics and Text Analytics Lab	

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20.	AI326	Speech Processing Techniques and Applications	2-0-2
	AI326L	Speech Processing Techniques and Applications Lab	0-1-1
21.	AI327	Knowledge Graphs	2-0-2
	AI327L	Knowledge Graphs Lab	0-1-1
22.	AI328	Large Language Models: From Theory to Applications	2-0-2
	AI328L	Large Language Models: From Theory to Applications Lab	0-1-1
23.	AI421	Semantic Technologies	2-0-2
	AI421L	Semantic Technologies Lab	0-1-1
24.	AI428	Explainable Artificial Intelligence	2-0-2
	AI428L	Explainable Artificial Intelligence Lab	0-1-1
25.	AI429	Applied Natural Language Processing	2-0-2
	AI429L	Applied Natural Language Processing Lab	0-1-1

List of Elective Supporting Courses

S. No.	Course Code	Course Title	Pre-req.	Cr. Hrs.
1.	MK101	Principles of Marketing	-	3-0-3
2.	AF142	Financial Accounting	-	3-0-3

List of General Education Courses

S. No.	Course Code	Course Title	Pre-req.	Cr. Hrs.
1.	CS181	Application of Information & Communication Technologies	-	2-0-2
	CS181L	Application of Information & Communication Technologies Lab	-	0-1-1
2.	EL170	Functional English	-	3-0-3
3.	EL271	Expository Writing	EL170	3-0-3
4.	MA216	Quantitative Reasoning -I (Discrete Structures)	-	3-0-3
5.	MA110	Quantitative Reasoning -II (Calculus & Analytical Geometry)	-	3-0-3
6.	HU124	Islamic Studies & Ethics	-	2-0-2
7.	HU405	Ideology and Constitution of Pakistan	-	2-0-2
8.	BA152	Social Sciences (Introduction to Management)	-	2-0-2
9.	PH111	Natural Sciences (Applied Physics)	-	2-0-2
	PH111L	Natural Sciences (Applied Physics Lab)	-	0-1-1
10.	CS470	Arts & Humanities (Professional Practices)	-	2-0-2
11.	HU411	Civics and Community Engagement	-	2-0-2
12.	BA353	Entrepreneurship	-	2-0-2

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