

M-01

Director Academics

Approved
22/9/25

Dean Faculty of Computing & AI

Recommended. please.
5/9/25

1. The Department of Creative Technologies has held a **DBS meeting** on curriculum changes for **BSAI, BSDS, and BSSE** programs for the **Fall 2025 intake and onwards**, followed by the **FBS**.
 - The relevant minutes of these meetings are attached as **Flag A** and **Flag B**.
 - The updated curriculums for Fall 2025 and onwards are attached as **Flag C**.
 - Additionally, the **Fall 2023 curriculums** for all three programs have also been updated with the inclusion of **Pakistan Studies (HU115)** in **Semester 7**. (Attached as **Flag D**).
2. The case is hereby forwarded for kind **approval of the updated curriculums**, please


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Professor
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Department of Creative Technologies

05 Sep 2025

Office of Dir. Acad	
Date	5/9/25
Sr. No.	771 MA

Scheme of Studies

Faculty of Computing and Artificial Intelligence
Department of Creative Technologies
Bachelor of Science in Data Science
(Applicable from Fall-2025 Intake & Onwards)

Framework of BSAI Program					
Area	Category	Code	Course Title	Cr. Hrs.	%
Computing	Computing Core	CS111	Programming Fundamentals	3-0-3	
		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	
		SE100	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	
		DS497	Final Year Project - I	0-1-1	
		DS498	Final Year Project - II	0-2-2	
		DS499	Final Year Project - III	0-3-3	
	Domain Core	DS110	Introduction to Data Science	2-0-2	
		DS110L	Introduction to Data Science Lab	0-1-1	
		DS212	Applied Statistics	2-0-2	
		DS212L	Applied Statistics Lab	0-1-1	
		CS426	Parallel and Distributed Computing	2-0-2	
		CS426L	Parallel and Distributed Computing Lab	0-1-1	
		DS312	Data Mining	2-0-2	
		DS312L	Data Mining Lab	0-1-1	
		DS460	Data Visualization	2-0-2	
		DS460L	Data Visualization Lab	0-1-1	
		DS400	Data Warehousing and Business Intelligence	2-0-2	
		DS400L	Data Warehousing and Business Intelligence Lab	0-1-1	
	Domain Elective	DSXXX	Domain Elective - I	2-0-2	
		DSXXXL	Domain Elective - I Lab	0-1-1	
		DSXXX	Domain Elective - II	2-0-2	
		DSXXXL	Domain Elective - II Lab	0-1-1	
		DSXXX	Domain Elective - III	2-0-2	
		DSXXXL	Domain Elective - III Lab	0-1-1	

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		DSXXX	Domain Elective - IV	2-0-2	
		DSXXXL	Domain Elective - IV Lab	0-1-1	
		DSXXX	Domain Elective - V	2-0-2	
		DSXXXL	Domain Elective - V Lab	0-1-1	
		DSXXX	Domain Elective - VI	2-0-2	
		DSXXXL	Domain Elective - VI Lab	0-1-1	
		DSXXX	Domain Elective - VII	2-0-2	
		DSXXXL	Domain Elective - VII Lab	0-1-1	
Total	Number of Computing Core Courses: *14			Cr. Hrs. : 46 (30 - 16)	62%
	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 & Supporting Courses	MA105	Multivariable Calculus	3-0-3	
		MA201	Linear Algebra	3-0-3	
		MA301	Probability and Statistics	3-0-3	
		EL400	Technical & Business Writing	3-0-3	
	Elective Supporting	XXXXX	Elective Supporting - I	3-0-3	
	General Education Requirement Courses	CS181	Applications of Information & Communication Technologies	2-0-2	
		CS181L	Applications 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	
		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	
		HU115	Pakistan Studies	2-0-2	
		FQ100	Fehm-e-Quran I	0-1-1	
		FQ101	Fehm-e-Quran II	0-1-1	
Total	Number of Mathematics and Supporting Courses: 04			Cr. Hrs. : 12 (12 - 0)	38%
	Number of Elective Supporting Courses: 01			Cr. Hrs. : 3 (3 - 0)	
	Number of General Education Requirement Courses: 15			Cr. Hrs. : 34 (30 - 4)	
	Number of Non-Computing Courses: 20			Cr. Hrs. : 49 (45 - 4)	
Grand Total	Total Number of Courses: 47 + Internship				
	Total Cr. Hrs. : 134 (101 - 33) + Internship (03) = 137				

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Semester-Wise Scheme of Studies

Faculty of Computing and Artificial Intelligence
Department of Creative Technologies
Bachelor of Science in Data Science
(Applicable from Fall-2025 Intake & Onwards)

Semester – I				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	CS111	Programming Fundamentals		3 – 0 – 3
2	CS111L	Programming Fundamentals Lab		0 – 1 – 1
3	CS181	Applications of Information & Communication Technologies		2 – 0 – 2
4	CS181L	Applications 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	HU115	Pakistan Studies		2 – 0 – 2
10	*MA114	Foundational Mathematics (Non-Credit for Medical students)		3 – 0 – 3
Total Contact Hours: 23			Total Cr. Hr.	14 – 3 – 17

Semester – II				
S. No.	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	EE123	Digital Logic Design	-	2 – 0 – 2
4	EE123L	Digital Logic Design Lab	-	0 – 1 – 1
5	CS260	Computer Networks	-	2 – 0 – 2
6	CS260L	Computer Networks Lab	-	0 – 1 – 1
7	DS110	Introduction to Data Science	-	2 – 0 – 2
8	DS110L	Introduction to Data Science Lab	-	0 – 1 – 1
9	MA216	Discrete Structures	-	3 – 0 – 3
10	FQ100	Fehm-e-Quran I	-	0 – 1 – 1
	*MA118	Pre-Calculus (Non-Credit for Medical Students only)	-	3 – 0 – 3
Total Contact Hours: 25			Total Cr. Hr.	12 – 5 – 17

Semester – III				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	CS216	Data Structures	CS112, CS112L	3 – 0 – 3
2	CS216L	Data Structures	CS112, CS112L	0 – 1 – 1
3	CS226	Computer Organization and Assembly Language	EE123, EE123L	2 – 0 – 2
4	CS226L	Computer Organization and Assembly Language Lab	EE123, EE123L	0 – 1 – 1
5	AI232L	Introduction to Artificial Intelligence	-	2 – 0 – 2
6	AI232L	Introduction to Artificial Intelligence Lab	-	0 – 1 – 1
7	FQ101	Fehm-e-Quran II	FQ100	0 – 1 – 1
8	MA110	Calculus & Analytical Geometry	-	3 – 0 – 3
9	MA301	Probability and Statistics	-	3 – 0 – 3
Total Contact Hours: 25			Total Cr. Hr.	13 – 4 – 17

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Semester – IV				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	DS212	Applied Statistics	MA301	2 – 0 – 2
2	DS212L	Applied Statistics Lab	MA301	0 – 1 – 1
3	CS130	Database Systems	-	3 – 0 – 3
4	CS130L	Database Systems Lab	-	0 – 1 – 1
5	MA105	Multivariable Calculus	MA110	3 – 0 – 3
6	CS332	Design and Analysis of Algorithms	CS216, CS216L	3 – 0 – 3
7	DSXXX	Domain Elective - I	-	2 – 0 – 2
8	DSXXXL	Domain Elective - I Lab	-	0 – 1 – 1
Total Contact Hours: 22			Total Cr. Hr.	13 – 3 – 16

Summer				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	DS496	*Internship	-	03
*Internship Requirement: Each student must complete a 6-week internship after the 4th semester, preferably during the summer break. The internship will be evaluated as a 3-credit hour course and included in the transcript. In exceptional cases, students may defer the internship until after the 6th semester with approval from the Head of Department.				

Semester – V				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	CS325	Operating Systems	CS226, CS226L	2 – 0 – 2
2	CS325L	Operating Systems Lab	CS226, CS226L	0 – 1 – 1
3	DS312	Data Mining	DS210, DS210L	2 – 0 – 2
4	DS312L	Data Mining Lab	DS210, DS210L	0 – 1 – 1
5	DSXXX	Domain Elective - II	-	2 – 0 – 2
6	DSXXXL	Domain Elective - II Lab	-	0 – 1 – 1
7	DSXXX	Domain Elective - III	-	2 – 0 – 2
8	DSXXXL	Domain Elective - III Lab	-	0 – 1 – 1
9	MA201	Linear Algebra	-	3 – 0 – 3
10	BA152	Introduction to Management	-	2 – 0 – 2
Total Contact Hours: 25			Total Cr. Hr.	13 – 4 – 17

Semester – VI				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	CS426	Parallel and Distributed Computing	CS325, CS325L	2 – 0 – 2
2	CS426L	Parallel and Distributed Computing Lab	CS325, CS325L	0 – 1 – 1
3	SE100	Software Engineering	-	3 – 0 – 3
4	EL271	Expository Writing	EL170	3 – 0 – 3
5	DSXXX	Domain Elective - IV	-	2 – 0 – 2
6	DSXXXL	Domain Elective - IV Lab	-	0 – 1 – 1
7	DSXXX	Domain Elective - V	-	2 – 0 – 2
8	DSXXXL	Domain Elective - V Lab	-	0 – 1 – 1
9	DS497	Final Year Project - I	List-A	0 – 1 – 1
Total Contact Hours: 20 + 3 Hrs. FYP			Total Cr. Hr.	12 – 4 – 16

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Semester – VII				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	DS498	Final Year Project - II	DS497	0 – 2 – 2
2	DS460	Data Visualization	-	2 – 0 – 2
3	DS460L	Data Visualization Lab	-	0 – 1 – 1
4	DSXXX	Domain Elective - VI	-	2 – 0 – 2
5	DSXXXL	Domain Elective - VI Lab	-	0 – 1 – 1
6	DS400	Data Warehousing and Business Intelligence	-	2 – 0 – 2
7	DS400L	Data Warehousing and Business Intelligence Lab	-	0 – 1 – 1
8	CS215	Information Security	-	2 – 0 – 2
9	CS215L	Information Security Lab	-	0 – 1 – 1
10	EL400	Technical & Business Writing	-	3 – 0 – 3
Total Contact Hours: 23 + 6 Hrs. FYP			Total Cr. Hr.	11 – 6 – 17

Semester – VIII				
S. No.	Code	Course Title	Pre-Req.	Cr. Hrs.
1	DS499	Final Year Project - III	DS498	0 – 3 – 3
2	HU405	Ideology and Constitution of Pakistan	-	2 – 0 – 2
3	CS470	Professional Practices	-	2 – 0 – 2
4	HU411	Civics and Community Engagement	-	2 – 0 – 2
5	DSXXX	Domain Elective - VII	-	2 – 0 – 2
6	DSXXXL	Domain Elective - VII Lab	-	0 – 1 – 1
7	XXXXX	Elective Supporting – I	-	3 – 0 – 3
8	BA353	Entrepreneurship	-	2 – 0 – 2
Total Contact Hours: 16 + 9 Hrs. FYP			Total Cr. Hr.	13 – 4 – 17

Program Total Credit Hours: 134 (101 – 33) + Internship (03) = 137

List-A: Pre-Requisite Courses for Final Year Project - I				
S. No.	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 – 1 – 1	

List of Domain Elective Courses

Note: Students are required to complete seven (07) domain elective courses, with at least five (05) selected from the designated list below. Up to two (02) electives may be taken from other departments within the Faculty of Computing and Artificial Intelligence (FCAI), subject to approval by the respective HoDs.

No.	Code	Course Title	Cr. Hr.
Group 01: Data Engineering and Big Data Systems			
1	DS320	Big Data Analytics	2 – 0 – 2
	DS320L	Big Data Analytics Lab	0 – 1 – 1
2	DS421	Cloud Computing	2 – 0 – 2
	DS421L	Cloud Computing Lab	0 – 1 – 1
3	DS354	Platforms & Architecture for Data Science	2 – 0 – 2
	DS354L	Platforms & Architecture for Data Science Lab	0 – 1 – 1

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4	DS220	Advanced Data Engineering	2-0-2
	DS220L	Advanced Data Engineering Lab	0-1-1
5	DS225	Graph and Vector Databases	2-0-2
	DS225L	Graph and Vector Databases Lab	0-1-1
6	DS348	Information Theory & Data Compression	2-0-2
	DS348L	Information Theory & Data Compression Lab	0-1-1
Group 02: Statistical Learning, Modeling & Inference			
7	DS316	Multivariate Techniques in Data Science	2-0-2
	DS316L	Multivariate Techniques in Data Science Lab	0-1-1
8	DS359	Computational Bayesian	2-0-2
	DS359L	Computational Bayesian Lab	0-1-1
9	DS313	Survival Analysis	2-0-2
	DS313L	Survival Analysis Lab	0-1-1
10	DS477	Stochastic Processes	2-0-2
	DS477L	Stochastic Processes Lab	0-1-1
11	DS349	Statistical Learning for Data Science	2-0-2
	DS349L	Statistical Learning for Data Science Lab	0-1-1
12	DS346	Predictive Analytics and Forecasting	2-0-2
	DS346L	Predictive Analytics and Forecasting Lab	0-1-1
Group 03: Applied Machine Learning & AI for Domains			
13	DS352	Machine Learning	2-0-2
	DS352L	Machine Learning Lab	0-1-1
14	DS455	Deep Learning	2-0-2
	DS455L	Deep Learning Lab	0-1-1
15	DS351	Natural Language Processing	2-0-2
	DS351L	Natural Language Processing Lab	0-1-1
16	DS470	Speech Processing	2-0-2
	DS470L	Speech Processing Lab	0-1-1
17	DS350	Digital Image Processing	2-0-2
	DS350L	Digital Image Processing Lab	0-1-1
18	DS255	Fundamentals of Computer Vision	2-0-2
	DS255L	Fundamentals of Computer Vision Lab	0-1-1
19	DS451	Text Mining	2-0-2
	DS451L	Text Mining Lab	0-1-1
20	DS478	Evolutionary Computing	2-0-2
	DS478L	Evolutionary Computing Lab	0-1-1
21	DS355	Agent Based Modelling	2-0-2
	DS355L	Agent Based Modelling Lab	0-1-1
Group 04: Knowledge Discovery and Advanced Analytics			
22	DS301	Knowledge Representation & Reasoning	2-0-2
	DS301L	Knowledge Representation & Reasoning Lab	0-1-1
23	DS340	Business Process Analysis	2-0-2
	DS340L	Business Process Analysis Lab	0-1-1
24	DS472	Financial Data Analytics	2-0-2
	DS472L	Financial Data Analytics Lab	0-1-1
25	DS358	Data-driven Healthcare Systems	2-0-2
	DS358L	Data-driven Healthcare Systems Lab	0-1-1
26	DS473	Timeseries Analysis	2-0-2
	DS473L	Timeseries Analysis Lab	0-1-1
27	DS474	Spatio-Temporal Analytics	2-0-2
	DS474L	Spatio-Temporal Analytics Lab	0-1-1

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28	DS449	Data-Driven Decision-Making	2-0-2
	DS449L	Data-Driven Decision-Making Lab	0-1-1
29	DS444	Energy Market Forecasting and Optimization	2-0-2
	DS444L	Energy Market Forecasting and Optimization Lab	0-1-1
30	DS443	Operations Data Analysis	2-0-2
	DS443L	Operations Data Analysis Lab	0-1-1
31	DS417	Spatial Statistics with Geographic Information Systems	2-0-2
	DS417L	Spatial Statistics with Geographic Information Systems Lab	0-1-1
32	DS452	Climate Analytics	2-0-2
	DS452L	Climate Analytics Lab	0-1-1
Group 05: Specialized Tools & Emerging Topics			
32	DS459	Advanced Large Language Models	2-0-2
	DS459L	Advanced Large Language Models Lab	0-1-1
33	DS321	Semantic Computing	2-0-2
	DS321L	Semantic Computing Lab	0-1-1
34	DS256	HCI & Computer Graphics	2-0-2
	DS256L	HCI & Computer Graphics Lab	0-1-1
35	DS456	Pervasive Computing	2-0-2
	DS456L	Pervasive Computing Lab	0-1-1
36	DS462	Explainable AI	2-0-2
	DS462L	Explainable AI Lab	0-1-1
37	DS356	Data-Driven Mobile App Development	2-0-2
	DS356L	Data-Driven Mobile App Development Lab	0-1-1
38	DS357	Web Technologies for Data Science Applications	2-0-2
	DS357L	Web Technologies for Data Science Applications Lab	0-1-1
39	DS459	Advanced Large Language Models	2-0-2
	DS459L	Advanced Large Language Models Lab	0-1-1

List of Elective Supporting Courses

S. No.	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.	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	Discrete Structures	-	3-0-3
5	MA110	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	Introduction to Management	-	2-0-2
9	PH111	Applied Physics	-	2-0-2
	PH111L	Applied Physics Lab	-	0-1-1
10	CS470	Professional Practices	-	2-0-2
11	HU411	Civics and Community Engagement	-	2-0-2
12	BA353	Entrepreneurship	-	2-0-2
13	HU115	Pakistan Studies	-	2-0-2
14	FQ100	Fehm-e-Quran I	-	0-1-1
15	FQ101	Fehm-e-Quran II	-	0-1-1

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