

**SCHEME OF STUDY
COMPUTER SCIENCE (SPECIALISATION IN DATA SCIENCE)**

Batch 2022				
FIRST YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2022	CT-175	Programming Fundamentals	3	1 4
	CT-174	Fundamentals of Information Technology	2	1 3
	MT-174	Differential & Integral Calculus	3	0 3
	PH-122	Applied Physics	3	1 4
	HS-205	Islamic Studies OR	2	0 2
SPRING 2023	HS-209	Ethical Behaviour		
	MT-201	Mathematics-1 (for Pre-Medical)	NC	
	CS-251	Logic Design & Switching Theory	3	1 4
	CT-162	Discrete Structures	3	0 3
	CT-260	Object Oriented Programming	3	1 4
	HS-104	Functional English	3	0 3
	HS-105	Pakistan Studies OR	2	0 2
	HS-127	Pakistan Studies (for Foreigners)		
	HS-220	Chinese Language-I	NC	
	HS-231	Turkish Language-I	NC	
HS-224	German language-I	NC		
HS-226	French language-I	NC		
MT-202	Mathematics-2 (for Pre-Medical)	NC		
New Specialisation vide Resolution No. SYN-200.6(b)(iv)				

Batch 2023				
FIRST YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2023	CT-175	Programming Fundamentals	3	1 4
	CT-174	Fundamentals of Information Technology	2	1 3
	**EA-104	Functional English	3	0 3
	PH-122	Applied Physics	3	1 4
	**ES-205	Islamic Studies OR	2	0 2
SPRING 2024	**ES-209	Ethical Behaviour		
	MT-201	Mathematics-1 (for Pre-Medical)	NC	
	CS-251	Logic Design & Switching Theory	3	1 4
	CT-162	Discrete Structures	3	0 3
	CT-260	Object Oriented Programming	3	1 4
	MT-171	Differential & Integral Calculus	3	0 3
	**ES-105	Pakistan Studies OR	2	0 2
	**ES-127	Pakistan Studies (for Foreigners)		
	**ES-127	Pakistan Studies (for Foreigners)		
	MT-002	Mathematics-2 (for Pre-Medical)	NC	
** Under Section 28(iv) Office Order Acad42(156)1699				
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** Under Section 28(iv) Office Order Acad42(156)1699				

Batch 2022				
SECOND YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2023	CT-159	Data Structure Algorithms & Applications	3	1 4
	MT-227	Differential Equations	3	0 3
	**EA-115	Academic Reading and Writing	3	0 3
	**EA-219	Professional Ethics	2	0 2
	CT-259	System Analysis & Design	3	0 3
SPRING 2024	**EA-221	Chinese Language-II	NC	
	**EA-232	Turkish Language-II	NC	
	**EA-225	German language-II	NC	
	**EA-227	French language-II	NC	
	CS-252	Computer Architecture & Organisation	3	1 4
	CT-261	Database Management Systems	3	1 4
	**EA-218	Business Communications	2	1 3
	**EC-209	Financial & Cost Accounting	3	0 3
	MT-272	Linear Algebra & Geometry	3	0 3
	**EA-200	Community Service	NC	
New Specialisation vide Resolution No. SYN-200.6(b)(iv)				
** Changed vide Resolution No. EMG-AC-1(A)				
** Under Section 28(iv) Office Order Acad42(156)1699				

Batch 2023				
SECOND YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2024	CT-159	Data Structure Algorithms & Applications	3	1 4
	MT-227	Differential Equations	3	0 3
	**EA-115	Academic Reading and Writing	3	0 3
	EA-219	Professional Ethics	2	0 2
	**MT-331	Probability & Statistics	3	0 3
SPRING 2025	CS-252	Computer Architecture & Organisation	3	1 4
	CT-261	Database Management Systems	3	1 4
	EA-218	Business Communications	2	1 3
	EC-209	Financial & Cost Accounting	3	0 3
	MT-272	Linear Algebra & Geometry	3	0 3
	EA-200	Community Service	NC	
	** Changed vide Resolution No. AC-163.5(v)			

Batch 2022				
THIRD YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2024	CT-368	Fundamentals of Data Science	2	1 3
	MT-331	Probability & Statistics	3	0 3
	CT-498	Data Science Elective-I	3	0 3
SPRING 2025	CT-365	Software Engineering	3	0 3
	CT-361	Artificial Intelligence & Expert Systems	3	1 4
	CT-356	Data Mining	3	1 4
	CT-366	Data Science Elective-II	3	0 3
	CT-376	Computer Communication Networks	3	1 4
CT-363	Design & Analysis of Algorithms	3	0 3	
CT-353	Operating Systems	3	1 4	
New Specialisation vide Resolution No. SYN-200.6(b)(iv)				
** Changed vide Resolution No. EMG-AC-1(A)				

Batch 2023				
THIRD YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2025	**CT-XXX	Data Science Elective-I		
	**CT-XXX	Data Science Elective-II		
	**CT-265	Introduction to Tools and Techniques for Data Science	2	1 3
SPRING 2026	CT-365	Software Engineering	3	0 3
	CT-361	Artificial Intelligence & Expert Systems	3	1 4
	**CT-XXX	Data Science Elective-III	3	0 3
	CT-356	Data Mining	3	1 4
	CT-376	Computer Communication Networks	3	1 4
	CT-363	Design & Analysis of Algorithms	3	0 3
	CT-353	Operating Systems	3	1 4
**EA/ES	Foreign Language-I	NC		
** Changed vide Resolution No. AC-163.5(i)				
** Changed vide Resolution No. AC-164.4(v)				
** Under Section 28(iv) Office Order Acad42(156)1699				

Batch 2024				
THIRD YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2026	CT-XXX	Data Science Elective-I		
	CT-XXX	Data Science Elective-II		
	CT-XXX	Introduction to Tools and Techniques for Data Science	2	1 3
SPRING 2027	CT-365	Software Engineering	3	0 3
	CT-361	Artificial Intelligence & Expert Systems	3	1 4
	CT-XXX	Data Science Elective-III	3	0 3
	CT-356	Data Mining	3	1 4
	CT-376	Computer Communication Networks	3	1 4
	CT-363	Design & Analysis of Algorithms	3	0 3
	CT-353	Operating Systems	3	1 4
EA/ES	Foreign Language-I	NC		

Batch 2025				
THIRD YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2027	CT-265	Introduction to Tools and Techniques for Data Science	2	1 3
	CT-361	Artificial Intelligence and Expert Systems	3	1 4
	CT-363	Design and Analysis of Algorithms	3	0 3
SPRING 2028	CT-498	Data Science Elective I	3	0 3
	CT-361	Data Science Elective II	3	1 4
	CT-353	Information Security	3	0 3
	CT-356	Data Mining	3	1 4
	CT-356	Data Mining	3	1 4
	CT-376	Computer Communication Networks	3	1 4
	CT-376	Computer Communication Networks	3	1 4
EA/ES	Foreign Language-I	NC		
Changed with vide Resolution No. AC-168.4(vii)				

Batch 2022				
FINAL YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2025	CT-499	Software Based Project	0	3 3
	CT-498	Data Science Elective-III	3	0 3
	CT-472	Data Warehousing & Business Intelligence	3	1 4
	MG-482	Organisational Behaviour	3	0 3
	CS-428	Parallel & Distributed Computing	3	1 4
SPRING 2026	CT-499	Software Based Project	0	3 3
	CT-471	Data Analysis & Visualisation	3	1 4
	CT-498	Data Science Elective-IV	3	0 3
	MG-481	Entrepreneurship	3	0 3
	CT-355	Information Security	3	0 3
New Specialisation vide Resolution No. SYN-200.6(b)(iv)				

Batch 2023				
FINAL YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2026	**CT-499	Computer Science Project	0	3 3
	CT-498	Data Science Elective-IV	3	0 3
	CT-472	Data Warehousing & Business Intelligence	3	1 4
	CT-471	Data Analysis & Visualisation	3	1 4
	CS-428	Parallel & Distributed Computing	3	1 4
SPRING 2027	**EA/ES	Foreign Language-II	NC	
	**CT-499	Computer Science Project	0	3 3
	MG-482	Organisational Behaviour	3	0 3
	CT-355	Information Security	3	0 3
	CT-410	Generative AI	3	0 3
** Changed vide Resolution No. AC-163.5(v)				
** Changed vide Resolution No. AC-164.4(v)				
** Under Section 28(iv) Office Order Acad42(156)1699				

Batch 2024				
FINAL YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2027	CT-499	Computer Science Project	0	3 3
	CT-498	Data Science Elective-IV	3	0 3
	CT-472	Data Warehousing & Business Intelligence	3	1 4
	CT-471	Data Analysis & Visualisation	3	1 4
	CS-428	Parallel & Distributed Computing	3	1 4
SPRING 2028	**EA/ES	Foreign Language-II	NC	
	CT-499	Computer Science Project	0	3 3
	MG-482	Organisational Behaviour	3	0 3
	MG-481	Entrepreneurship	3	0 3
	CT-355	Information Security	3	0 3
CT-410	Generative AI	3	0 3	

Batch 2025				
FINAL YEAR ----- SEMESTER SYSTEM				
Course Code	Course Title	Crd Hrs	Th	Pr T
Computer Science (Specialisation In Data Science)				
FALL 2028	CT-471	Data Analysis and Visualisation	3	1 4
	CT-472	Data Warehousing and Business Intelligence	3	1 4
	CT-498	Data Science Elective IV	3	0 3
SPRING 2029	CT-499	Computer Science Project	0	3 3
	CS-428	Parallel and Distributed Computing	3	1 4
	**EA/ES	Foreign Language-II	NC	
	CT-499	Computer Science Project	0	3 3
	CT-498	Data Science Elective V	3	0 3
MG-482	Organisational Behaviour	3	0 3	
MG-481	Entrepreneurship	3	0 3	
MG-482	Organisational Behaviour	3	0 3	
Changed with vide Resolution No. AC-168.4(vii)				

Course Code	Course Title	Crd Hrs	Th	Pr T
CT-378	Machine Learning	3	0 3	
CT-357	Speech Processing	3	0 3	
CT-369	Business Process Analysis	3	0 3	
CT-370	Platform & Architecture for Data Science	3	0 3	
Elective-III and IV				
CT-468	Artificial Neural Networks	3	0 3	
CT-469	Deep Learning	3	0 3	
CT-473	Cloud Computing	3	0 3	
CT-474	Text Mining	3	0 3	
CT-475	Privacy Preservation	3	0 3	
** Changed vide Resolution No. EMG-AC-1(A)				

Batch 2023				
Elective Courses				
Course Code	Course Title	Crd Hrs	Th	Pr T
Elective-I	CT-263	Object Oriented Analysis & Design	2	1 3
	**CT-264	Programming for Artificial Intelligence	2	1 3
	**CT-368	Fundamentals of Data Science	2	1 3
	CT-265	Fundamentals of Cybersecurity	2	1 3
	CT-267	Fundamentals of Game Development	2	1 3
Elective-II	CT-369	Business Process Analysis	3	0 3
	CT-370	Platform & Architecture for Data Science	3	0 3
	CT-378	Machine Learning	3	0 3
Elective-III	CT-357	Speech Processing	3	0 3
	CT-465	Artificial Neural Networks	3	0 3
	CT-403	Blockchain Technologies	2	1 3
Elective-IV	**CT-411	Introduction to Quantum Computing	3	0 3
	CT-475	Privacy Preservation	3	0 3
	CT-468	Deep Learning	3	0 3
Elective-V	CT-473	Cloud Computing	3	0 3
	CT-474	Text Mining	3	0 3
	** Changed vide Resolution No. EMG-AC-1(A)			
** Changed vide Resolution No. AC-163.5(v)				
** Changed vide Resolution No. AC-165.4(v)				

Batch 2024				
Elective Courses				
Course Code	Course Title	Crd Hrs	Th	Pr T
Elective-I	CT-263	Object Oriented Analysis & Design	2	1 3
	CT-264	Programming for Artificial Intelligence	2	1 3
	CT-368	Fundamentals of Data Science	2	1 3
	CT-265	Fundamentals of Cybersecurity	2	1 3
	CT-267	Fundamentals of Game Development	2	1 3
Elective-II	CT-369	Business Process Analysis	3	0 3
	CT-370	Platform & Architecture for Data Science	3	0 3
	CT-378	Machine Learning	3	0 3
Elective-III	CT-357	Speech Processing	3	0 3
	CT-466	Artificial Neural Networks	3	0 3
	CT-403	Blockchain Technologies	2	1 3
Elective-IV	CT-411	Introduction to Quantum Computing	3	0 3
	CT-475	Privacy Preservation	3	0 3
	CT-468	Deep Learning	3	0 3
Elective-V	CT-473	Cloud Computing	3	0 3
	CT-474	Text Mining	3	0 3
	** Changed vide Resolution No. EMG-AC-1(A)			
** Changed vide Resolution No. AC-163.5(v)				
** Changed vide Resolution No. AC-165.4(v)				

Batch 2025				
Elective Courses				
Course Code	Course Title	Crd Hrs	Th	Pr T
E-I	CT-263	Object Oriented Analysis and Design	2	1 3
	CT-264	Programming for Artificial Intelligence	2	1 3
	CT-266	Fundamentals of Cybersecurity	2	