Scheme of Studies

Faculty of Computing and Artificial Intelligence
Department of Computer Games Development (CGD)
Bachelor of Science in Computer Games Development
(*Applicable from Fall-2023 Intake & Onwards*)

Framework of BSCGD 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	
		CG497	Final Year Project – I	0-1-1	
		CG498	Final Year Project – II	0-2-2	
		CG499	Final Year Project - III	0-3-3	
	Domain Core	CG201	Game Design Principles	2-0-2	
		CG201L	Game Design Principles Lab	0-1-1	
		CG202	Graphic Design & Illustration Art	2-0-2	
		CG202L	Graphic Design & Illustration Art Lab	0-1-1	
		CG223	Game Programming	2-0-2	
		CG223L	Game Programming Lab	0-1-1	
		CG338	Game Engine Architecture	2-0-2	

		CG338L	Game Engine Architecture Lab	0-1-1	
		CG341	3D Design and Modeling	2-0-2	
		CG341L	3D Design and Modeling Lab	0-1-1	
		CG347	3D Animation and Visual Effects Production	2-0-2	
		CG347L	3D Animation and Visual Effects Production Lab	0-1-1	
	Domain Elective	CGXXX	CG Elective – I	2-0-2	
		CGXXXL	CG Elective – I Lab	0-1-1	
		CGXXX	CG Elective – II	2-0-2	
		CGXXXL	CG Elective – II Lab	0-1-1	
		CGXXX	CG Elective – III	2-0-2	
		CGXXXL	CG Elective – III Lab	0-1-1	
		CGXXX	CG Elective – IV	2-0-2	
		CGXXXL	CG Elective – IV Lab	0-1-1	
		CGXXX	CG Elective – V	2-0-2	
		CGXXXL	CG Elective – V Lab	0-1-1	
		CGXXX	CG Elective – VI	2-0-2	
		CGXXXL	CG Elective – VI Lab	0-1-1	
		CGXXX	CG Elective – VII	2-0-2	
		CGXXXL	CG 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 – 1 (Discrete Structures)	3-0-3	
		MA110	Quantitative Reasoning – 2 (Calculus and Analytic 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	Art & 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			

Semester-Wise Scheme of Studies

Faculty of Computing and Artificial Intelligence
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Bachelor of Science in Computer Games Development
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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				

Semester III				
S. No.	Course Code	Course Title	Pre-req.	Cr Hrs.
1.	CS216	Data Structures	CS112, CS112L	3-0-3
2.	CS216L	Data Structures Lab	CS112, CS112L	0-1-1
3.	CG203	Game Design Principles	-	2-0-2
4.	CG203L	Game Design Principles Lab	-	0-1-1
5.	CS260	Computer Networks	-	2-0-2
6.	CS260L	Computer Networks Lab	-	0-1-1
7.	MA110	Calculus and Analytic Geometry	-	3-0-3
8.	MA301	Probability and Statistics	-	3-0-3
Total Cr. Hrs.:				**13-3-16**
Total Contact Hours: 22				

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.	CG204	Graphic Design & Illustration Art	-	2-0-2
6.	CG204L	Graphic Design & Illustration Art Lab	-	0-1-1
7.	MA105	Multivariable Calculus	MA110	3-0-3
8.	MA201	Linear Algebra	-	3-0-3
9.	CGXXX	Domain Elective - I	-	2-0-2
10.	CGXXXL	Domain Elective - I Lab	-	0-1-1
Total Cr. Hrs.:				**14-4-18**
Total Contact Hours: 26				

Summer		
CG496	***Internship**	**03 Cr. Hrs.**

Internship Requirement: In order to graduate, every student must complete an internship program of 06 - 08 weeks duration after the completion of his/her fourth (04th) semester, preferably during the summer break. Their performance during the internship will be evaluated and graded as a 3-credit hour course and reflected in the transcript. Under exceptional circumstances, a student may be allowed to undertake the internship after the 6th semester with the approval of the HOD.

Semester V				
S. No.	**Course Code**	**Course Title**	**Pre-req.**	**Cr Hrs.**
1.	CS325	Operating Systems	-	2-0-2
2.	CS325L	Operating Systems Lab	-	0-1-1
3.	CG323	Game Programming	-	2-0-2
4.	CG323L	Game Programming Lab	-	0-1-1
5.	CG337	Game Engine Architecture	-	2-0-2
6.	CG337L	Game Engine Architecture Lab	-	0-1-1
7.	CGXXX	Domain Elective - II	-	2-0-2
8.	CGXXXL	Domain Elective - II Lab	-	0-1-1
9.	CS332	Design and Analysis of Algorithms	CS216, CS216L	3-0-3
10.	EL271	Expository Writing	EL170	3-0-3
Total Cr. Hrs.:				**14-4-18**
Total Contact Hours: 26				

Semester VI				
S. No.	**Course Code**	**Course Title**	**Pre-req.**	**Cr Hrs.**
1.	CG341	3D Design and Modeling	-	2-0-2
2.	CG341L	3D Design and Modeling Lab	-	0-1-1
3.	CGXXX	Domain Elective - III	-	2-0-2
4.	CGXXXL	Domain Elective - III Lab	-	0-1-1
5.	CGXXX	Domain Elective - IV	-	2-0-2
6.	CGXXXL	Domain Elective - IV Lab	-	0-1-1
7.	CGXXX	Domain Elective - V	-	2-0-2
8.	CGXXXL	Domain Elective - V Lab	-	0-1-1
9.	EL400	Technical & Business Writing	-	3-0-3
10.	BA353	Entrepreneurship	-	2-0-2
11.	CG497	Final Year Project - I	List-A	0-1-1
Total Cr. Hrs.:				**13-5-18**
Total Contact Hours: 26				

Semester VII				
S. No.	**Course Code**	**Course Title**	**Pre-req.**	**Cr Hrs.**
1.	CG498	Final Year Project - II	CG497	0-2-2
2.	CS215	Information Security	-	2-0-2
3.	CS215L	Information Security Lab	-	0-1-1
4.	CG447	3D Animation and Visual Effects Production		2-0-2
5.	CG447L	3D Animation and Visual Effects Production Lab		0-1-1
6.	CGXXX	Domain Elective - VI	-	2-0-2
7.	CGXXXL	Domain Elective - VI Lab	-	0-1-1
8.	CGXXX	Domain Elective - VII	-	2-0-2
9.	CGXXXL	Domain Elective - VII Lab	-	0-1-1
Total Cr. Hrs.:				**8-6-14**
Total Contact Hours: 22				

Semester VIII				
S. No.	**Course Code**	**Course Title**	**Pre-req.**	**Cr Hrs.**
1.	CG499	Final Year Project - III	CG498	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.	XXXXX	Elective Supporting – I		3-0-3
6.	BA152	Introduction to Management		2-0-2
Total Cr. Hrs.:				11-3-14
Total Contact Hours: 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.	Semester
1.	CS111	Programming Fundamentals	3-0-3	01
2.	CS111L	Programming Fundamentals Lab	0-1-1	01
3.	CS112	Object Oriented Programming	3-0-3	02
4.	CS112L	Object Oriented Programming Lab	0-1-1	02
5.	CS216	Data Structures	3-0-3	03
6.	CS216L	Data Structures Lab	0-1-1	03
7.	CS130	Database Systems	3-0-3	03
8.	CS130L	Database Systems Lab	0-0-1	03
9.	CG201	Game Design Principles	2-0-2	03
10.	CG201L	Game Design Principles Lab	0-1-1	03
11.	CG202	Graphic Design & Illustration Art	2-0-2	04
12.	CG202	Graphic Design & Illustration Art Lab	0-1-1	04

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.	CG231	UI/UX Design & Development	2-0-2
	CG231L	UI/UX Design & Development Lab	0-1-1
2.	CG235	Computer Graphics	2-0-2
	CG235L	Computer Graphics Lab	0-1-1
3.	CG205	Storyboarding and Narrative Development	2-0-2
	CG205L	Storyboarding and Narrative Development Lab	0-1-1
4.	CG455	Web Applications and Services	2-0-2
	CG455L	Web Applications and Services Lab	0-1-1
5.	CG354	Game Project Management	2-0-2
	CG354L	Game Project Management Lab	0-1-1
6.	CG212	Video Game Sound Design	2-0-2
	CG212L	Video Game Sound Design Lab	0-1-1
7.	CG348	Motion Capture Animation	2-0-2
	CG348L	Motion Capture Animation Lab	0-1-1
8.	CG333	Virtual Reality Game Development	2-0-2
	CG333L	Virtual Reality Game Development Lab	0-1-1
9.	CG453	Pervasive Game Development	2-0-2
	CG453L	Pervasive Game Development Lab	0-1-1
10.	CG431	Game Research Methods Systems	2-0-2
	CG431L	Game Research Methods Lab	0-1-1
11.	CG432	Game Analytics	2-0-2
	CG432L	Game Analytics Lab	0-1-1
12.	CG214	Game Testing	2-0-2
	CG214L	Game Testing Lab	0-1-1
13.	CG327	Web3 Gaming	2-0-2
	CG327L	Web3 Gaming Lab	0-1-1
14.	CG459	Digital Cinema Production	2-0-2
	CG459L	Digital Cinema Production 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	Discrete Structures	-	3-0-3
5.	MA110	Calculus and Analytic 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
10	PH111L	Applied Physics Lab	-	0-1-1
11.	CS470	Professional Practices	-	2-0-2
12.	HU411	Civics and Community Engagement	-	2-0-2
13.	BA353	Entrepreneurship	-	2-0-2