Annexure – B

Proposed Scheme of Studies for BS in Software Engineering (Fall-2020—Spring-2024)

Structure of BS (SE) Program

Areas Covered in BS SE program

Course Group	Credit hours
General Education	16
University Electives	12
Mathematics & Science Foundation	12
Computing – Core	39
Common courses (79 CH)	
Domain (SE)	
Domain Core (SE)	24
Domain Supporting (SE)	12
Domain Electives (SE)	15
Domain courses (51 CH)	
TOTAL	**130**

- ## General Education

General Education Courses (Credit Hours: 16)				
#	Code	Course Title	Credit Hours	Proposed Semester
1	HUM-101	Islamic Studies/Ethics	2 (2 + 0)	Semester-I
2	HUM-102	Pakistan Studies	2 (2 + 0)	Semester-I
3	ENG-101	English Composition & Comprehension	3 (3 + 0)	Semester-I
4	ENG-150	Communication and Presentation Skills	3 (3 + 0)	Semester-II
5	ENG-201	Technical Writing	3 (3 + 0)	Semester-III
6	CSC-101	Introduction to Information and Communication Technology (ICT)	3 (2 + 1)	Semester-I
		Total	**16**	

- ## University Elective Courses

University Elective Courses (Required Credit Hours: 09)		
#	Course Title	Credit Hours
1.	Principles of Management	3 (3 + 0)
2.	E-Business Management	3 (3 + 0)
3.	Technology Entrepreneurship	3 (3 + 0)
4.	Professional Practices	3 (3 + 0)
5.	Financial Accounting	3 (3 + 0)
6.	Research Methods in Computer Science	3 (3 + 0)
7.	Management Information Systems	3 (3 + 0)
8.	Organizational Behavior	3 (3 + 0)
9.	Human Resource Management	3 (3 + 0)

University Elective Courses (Required Credit Hours: 09)	
10. Financial Accounting	3 (3 + 0)
11. Financial Management	3 (3 + 0)
12. Principles of Marketing	3 (3 + 0)
13. Introduction to Economics	3 (3 + 0)
14. Psychology	3 (3 + 0)
15. International Relations	3 (3 + 0)
16. Foreign/Regional Language (French, German, Sindhi, Punjabi, Urdu etc.)	3 (3 + 0)
17. Philosophy	3 (3 + 0)
18. System Analysis & Design	3 (3 + 0)

- **Mathematics and Science Foundation:**

Mathematics and Science Foundation Courses (Credit Hours: 12)				
#	Code	Course Title	Credit Hours	Proposed Semester
1	PHY-150	Applied Physics	3 (2 + 1)	Semester-II
2	MTS-150	Calculus and Analytic Geometry	3 (3 + 0)	Semester-II
3	MTS-250	Linear Algebra	3 (3 + 0)	Semester-IV
4	MTS-302	Probability and Statistics	3 (3 + 0)	Semester-V
5	MTS-101	Precalculus	Non-Credit	Semester-I
		Total	**12**	

- **Computing Core**

Computing Core Courses (Credit Hours: 39)				
#	Code	Course Title	Credit Hours	Proposed Semester
1	CSC-102	Programming Fundamentals	4 (3 + 1)	Semester-I
2	CSC-151	Discrete Structures	3 (3 + 0)	Semester-II
3	CSC-150	Object-Oriented Programming	4 (3 + 1)	Semester-II
4	CSC-201	Data Structures	4 (3 + 1)	Semester-III
5	SWE-201	Software Engineering	3 (3 + 0)	Semester-III
6	CSC-252	Operating Systems	4 (3 + 1)	Semester-IV
7	CSC-301	Computer Networks	4 (3 + 1)	Semester-V
8	CSC-251	Database Systems	4 (3 + 1)	Semester-IV
9	CSC-353	Information Security	3 (3 + 0)	Semester-VI
10	FYP-401	Project-I	3 (0 + 3)	Semester-VII
11	FYP-451	Project-II	3 (0 + 3)	Semester-VIII
		Total	39	

- **Software Engineering Core**

Software Engineering Core Courses (Credit Hours: 21)				
#	Code	Course Title	Credit Hours	Proposed Semester
1	SWE-353	Software Construction & Development	3 (2 + 1)	Semester-VI
2	SWE-250	Software Requirements Engineering	3 (3 + 0)	Semester-IV
3	SWE-302	Software Design and Architecture	3 (3 + 0)	Semester-V
4	SWE-353	Software Quality Engineering	3 (3 + 0)	Semester-VI
5	SWE-401	Software Project Management	3 (3 + 0)	Semester-VII
6	SWE-402	Human Computer Interaction	3 (3 + 0)	Semester-VII

8	SWE-450	Software Re-Engineering	3 (3+0)	Semester-VIII
7	SWE-352	Web Engineering	3 (2 + 1)	Semester-VI
		Total	**24**	

• Software Engineering SUPPORTING

Software Engineering SUPPORTING Courses (Credit Hours: 12)				
#	Code	Course Title	Credit Hours	Proposed Semester
1	SWE-301	Operations Research	3 (3 + 0)	Semester -V
2	SWE -251	Business Process Engineering	3 (3 + 0)	Semester -IV
3	SWE -451	Software Testing	3 (3+0)	Semester-VIII
4	SWE-351	Formal Methods in Software Engineering	3 (3 + 0)	Semester -VI
		Total Credits	**12**	

• Software Engineering Elective

Software Engineering ELECTIVE Courses (Required Credit Hours: 21)		
#	Course Title	Credit Hours
1	Multimedia Technologies	3 (3 + 0)
2	Cloud Computing	3 (3 + 0)
3	Mobile Application Development	3 (2 + 1)
4	Emerging Trends in Software Engineering	3 (3 + 0)
5	Independent Study	3 (3 + 0)
6	Soft Computing	3 (3 + 0)

Software Engineering ELECTIVE Courses (Required Credit Hours: 21)		
#	Course Title	Credit Hours
7	Machine Learning	3 (3 + 0)
8	Scientific Computing	3 (3 + 0)
20	Data Mining	3 (3 + 0)
9	Expert Systems	3 (3 + 0)
10	Artificial Neural Network	3 (3 + 0)
11	Fuzzy Logic	3 (3 + 0)
12	Computational Intelligence	3 (3 + 0)
13	Multi Agent System	3 (3 + 0)
14	Natural Language Processing	3 (3 + 0)
15	Game Development	3 (3 + 0)
16	Visual Programming	3(2+1)
17	Software Verification and Validation	3 (3 + 0)
18	Information System Audit and Control	3 (3 + 0)
19	Introduction to Big Data	3 (3 + 0)
20	Business Intelligence	3 (3 + 0)
21	Sensing Technologies	3 (3 + 0)
22	Introduction to Semantic Web	3 (3 + 0)
23	Social Network Analysis	3 (3 + 0)

Software Engineering ELECTIVE Courses (Required Credit Hours: 21)		
#	Course Title	Credit Hours
24	Pervasive and Ubiquitous computing	3 (3 + 0)
25	Blockchain	3 (3 + 0)
26	Agile Software Engineering	3 (3 + 0)

SUKKUR IBA UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
Study Schema of BS Software Engineering Program

Semester Wise Study Plan - BS Software Engineering

Semester I (Credit Hours: 14)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite
1	CSC-101	Introduction to Information and Communication Technology (ICT)	General Education 1	3(2 + 1)	-NONE-
2	CSC-102	Programming Fundamentals	Computing Core 1	4 (3 + 1)	-NONE-
3	ENG-101	English Composition and Comprehension	General Education 2	3 (3 + 0)	-NONE-
4	MTS-101	Precalculus	Maths & Science 1	Non - Credit	-NONE-
5	HUM-101	Islamic Studies/Ethics	General Education 3	2 (2 + 0)	-NONE-
6	HUM-102	Pakistan Studies	General Education 4	2 (2 + 0)	-NONE-
			Total Credit Hours	**14**	

Semester II (Credit Hours: 16)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite Code	Pre-Requisite Course
1	CSC-150	Object-Oriented Programming	Computing Core 2	4 (3 + 1)	CSC-102	Programming Fundamentals
2	MTS-150	Calculus and Analytic Geometry	Maths & Science 2	3 (3 + 0)	None	
3	ENG-150	Communication and Presentation Skills	General Education 5	3 (3 + 0)	-NONE-	
4	CSC-151	Discrete Structures	Computing Core 3	3 (3 + 0)	-NONE-	
5	PHY-150	Applied Physics	Maths & Science 3	3 (2 + 1)	-NONE-	
			Total Credit Hours	**16**		

Semester III (Credit Hours: 16)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite Code	Pre-Requisite Course
1	CSC-201	Data Structures	Computing Core 4	4 (3 + 1)	CSC-102	Programming Fundamentals
5	ENG-201	Technical Writing	General Education 6	3 (3 + 0)	-NONE-	
3	SWE-201	Software Engineering	Computing Core 5	3 (3 + 0)	None	
3	xxx-xxx	Uni – Elective – I	Uni Elective 1	3 (3 + 0)	-NONE-	
5	xxx-xxx	Uni – Elective – II	Uni Elective 2	3 (3 + 0)	--	
			Total Credit Hours	**16**		

Semester IV (Credit Hours: 17)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite Code	Pre-Requisite Course
1	CSC-252	Operating Systems	Computing Core 6	4 (3 + 1)	-NONE-	
2	SWE-250	Software Requirements Engineering	SE Core 1	3 (3 + 0)	SWE-201	Software Engineering
3	MTS-250	Linear Algebra	Maths & Science 4	3 (3 + 0)	NONE-	
4	CSC-251	Database Systems	Computing Core 7	4 (3 + 1)	-NONE-	
5	SWE-251	Business Process Engineering	SE Support 1	3 (3 + 0)	-NONE-	
Total Credit Hours				**17**		

Semester V (Credit Hours: 19)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite Code	Pre-Requisite Course
1	xxx-xxx	SE Elective- I	SE Elective 1	3 (3 + 0)	-NONE-	
2	SWE-301	Operations Research	SE Support 2	3 (3 + 0)		
3	MTS-302	Probability and Statistics	Maths & Science 5	3 (3 + 0)	-NONE-	
4	xxx-xxx	Uni -Elective-III	Uni Elective 3	3 (3 + 0)	--	
5	CSC-301	Computer Networks	Computing Core 8	4 (3 + 1)	-NONE-	
6	SWE-302	Software Design and Architecture	SE Core 2	3 (3 + 0)	*SWE-250*	Software Requirement Engineering
Total Credit Hours				**19**		

Semester VI (Credit Hours: 18)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite Code	Pre-Requisite Course
1	CSC-353	Information Security	Computing Core 9	3 (3 + 0)	-NONE-	
2	SWE-350	Software Quality Engineering	SE Core 3	3 (3 + 0)	SWE-201	Software Engineering
3	SWE-351	Formal Methods in Software Engineering	SE Support 3	3 (3 + 0)	-NONE-	
4	SWE-352	Web Engineering	SE Core 4	3 (2 + 1)	CSC-102	Programming Fundamentals
5	xxx-xxx	SE Elective- II	SE Elective 2	3 (3 + 0)	--	
6	SWE-353	Software Construction & Development	SE Core 5	3 (3 + 0)	SWE-201	Software Engineering
Total Credit Hours				**18**		

Semester VII (Credit Hours: 15)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite Code	Pre-Requisite Course
1	SWE-401	Software Project Management	SE Core 6	3 (3 + 0)	SWE-201	Software Engineering
2	SWE-402	Human Computer Interaction	SE Core 7	3 (3 + 0)	--	
3	xxx-xxx	SE-Elective -III	SE Elective 3	3 (3 + 0)	--	
4	xxx-xxx	Uni – Elective -IV	Uni Elective 4	3 (3 + 0)	--	
5	FYP-401	Project-I	Computing Core 10	3 (0 + 3)	-NONE-	
Total Credit Hours				**15**		

Semester VIII (Credit Hours: 15)

#	Code	Course Name	Category	Credit Hours	Pre-Requisite Code	Pre-Requisite Course
1	SWE-450	Software Re-Engineering	SE Core 8	3 (3 + 0)	SWE-353	Software Construction & Development
2	xxx-xxx	SE-Elective-IV	SE Elective 5	3 (3 + 0)	--	
3	xxx-xxx	SE-Elective-V	SE Elective 6	3 (3 + 0)	--	
4	SWE-451	Software Testing	SE Support 7	3 (3 + 0)	--	
5	FYP-451	Project-II	Computing Core 11	3 (0 + 3)	FYP-401	
Total Credit Hours				**15**		