

## BS (Computer Science)

Recommended FEST 27<sup>th</sup> BOF w.e.f.  
Batch Spring 2016 onward

### Revised Plan of Studies (As on 28/08/2018)

SEMESTER-1				SEMESTER-2			
Code	Course Title	Pre-Req.	Cr. Hr.	Code	Course Title	Pre-Req.	Cr. Hr.
NS-111	Calculus and Analytical Geometry	-	3+0	NS-121	Multivariable Calculus	NS-111	3+0
CS-111	Introduction to Computing	-	2+1	CS-121	Programming Fundamentals	CS-111	3+1
HS-111	Functional English	-	3+0	CS-122	Discrete Structures	-	3+0
CS-112	Basic Electronics	-	2+1	HS-121	Communication Skills	-	3+0
HS-112	Pakistan Studies	-	2+0	MG/SS-XXX	University Elective – I	-	3+0
HS-113	Islamic Studies/Ethical Behavior	-	2+0				
<b>Total credits</b>			<b>16</b>	<b>Total credits</b>			<b>16</b>
SEMESTER-3				SEMESTER-4			
Code	Course Title	Pre-Req.	Cr. Hr.	Code	Course Title	Pre-Req.	Cr. Hr.
NS-211	Linear Algebra	-	3+0	CS-221	Data Structures and Algorithms	CS-121	3+1
CS-211	Digital Logic Design	-	3+1	CS-222	Data Communication and Computer Networks	CS-111	3+1
CS-212	Object Oriented Programming	CS-121	3+1	CS-223	Microprocessor and Assembly Language	CS-211	3+1
NS-212	Probability and Statistics	-	3+0	NS-221	Differential Equations	NS-111	3+0
MG/SS-XXX	University Elective – II	-	3+0	MG/SS-XXX	University Elective – III	-	3+0
<b>Total credits</b>			<b>17</b>	<b>Total credits</b>			<b>18</b>
SEMESTER-5				SEMESTER-6			
Code	Course Title	Pre-Req.	Cr. Hr.	Code	Course Title	Pre-Req.	Cr. Hr.
CS-311	Database Systems	CS-221	3+1	CS-321	Theory of Automata	CS-122	3+0
CS-312	Introduction to Software Engineering	CS-221	3+0	CS-322	Design and Analysis of Algorithms	CS-221	3+0
CS-313	Operating Systems	CS-111	3+1	CS-323	Computer Architecture and Organization	CS-211	3+0
CS-314	Numerical Computing	NS-221	2+1	HS-321	Technical Report Writing	-	3+0
MG/SS-XXX	University Elective – IV	-	3+0	CS-3XX	CS Elective – I	-	3+0/ (2+1)
				CS-3XX	CS Elective – II	-	3+0/ (2+1)
<b>Total credits</b>			<b>17</b>	<b>Total credits</b>			<b>18</b>
SEMESTER-7				SEMESTER-8			
Code	Course Title	Pre-Req.	Cr. Hr.	Code	Course Title	Pre-Req.	Cr. Hr.
CS-411	Human Computer Interaction	-	3+0	HS-421	Professional Practices	-	3+0
CS-412	Compiler Construction	CS-321	3+0	CS-421	Information Security	CS-222	3+0
CS-413	Artificial Intelligence	CS-122	2+1	CS-4XX	CS Elective – V	-	3+0/ (2+1)
CS-4XX	CS Elective – III	-	3+0/ (2+1)	CS-4XX	CS Elective – VI	-	3+0/ (2+1)
CS-4XX	CS Elective – IV	-	3+0/ (2+1)	CS-425	Final Year Project – II	CS-415	0+3
CS-415	Final Year Project – I	-	0+3				
<b>Total credits</b>			<b>18</b>	<b>Total credits</b>			<b>15</b>

NOTE: Students are required to take at-least 4 courses from specialized stream and the remaining (at max 2) may be taken from common or other stream electives.

University Electives				CS Electives			
Code	Course Title	Pre-Req.	Cr. Hr.	Code	Course Title	Pre-Req.	Cr. Hr.
MG-121	Financial Accounting	-	3+0	<b>Next Generation Networks and Applications</b>			
MG-211	Financial Management	MG-121	3+0	CS-361	Wireless Networks	CS-222	3+0
MG-221	Principles of Management and Economics	-	3+0	CS-363	Cryptography and Network Security	CS-222	3+0
MG-222	Marketing and Management	-	3+0	CS-371	Ubiquitous Computing	-	3+0
MG-311	Human Resource Management	-	3+0	CS-372	Sensor Networks	CS-222	3+0
MG-312	Entrepreneurship	-	3+0	CS-462	Network Management	CS-222	3+0
SS-311	Organizational Behavior	-	3+0	CS-464	Cloud Computing	CS-222	3+0
				CS-473	Distributed and Parallel Computing	-	3+0
<b>CS Electives</b>				CS-474	Next Generation Networks	CS-222	3+0
<b>Common Electives</b>							
CS-332	Advanced Computer Programming	CS-212	2+1				
CS-431	Modeling and Simulation	-	3+0	<b>Software Engineering</b>			
CS-432	Digital Image Processing	-	3+0	CS-381	Software Engineering Economics	CS-312	3+0
CS-433	Information Systems Audit	-	3+0	CS-382	Software Requirement Engineering	CS-312	3+0
CS-434	Operations Research	CS-314	3+0	CS-383	Software Project Management	CS-312	3+0
CS-436	Fuzzy Logic	CS-413	3+0	CS-483	Software Design Patterns	CS-312	3+0
CS-439	Concepts of Programming Languages	CS-212	3+0	CS-485	Software Architecture	CS-312	3+0
CS-440	Natural Language Processing	CS-321	3+0	CS-486	Software Quality Assurance	CS-312	3+0
CS-465	Multimedia Communications	-	3+0	CS-487	Business Process Automation	CS-312	3+0
CS-477	Computer Vision	-	3+0				
<b>Mobile and Web Application Development</b>				<b>Data Sciences</b>			
CS-351	Web Engineering	CS-121	2+1	CS-391	Data Sciences	NS – 212	3+0
CS-352	Mobile Application Development	-	2+1	CS-392	Probability and Statistics for Data Sciences	NS – 212	3+0
CS-353	Semantic Web	-	3+0	CS-393	Advanced Database Management Systems	CS – 311	3+0
CS-453	Mobile Middleware	-	3+0	CS-491	Machine Learning	CS – 122	3+0
CS-454	Mobile Databases	CS-311	3+0	CS-492	Data Analytics	CS – 391	3+0
CS-456	Computer Graphics	CS-212	3+0	CS-493	Data Visualization	CS – 391	3+0
CS-457	Network Programming	CS-222	2+1	CS-494	Deep Learning	CS – 391	3+0
CS-458	Advanced Operating Systems	CS-313	3+0	CS-495	Data Warehousing and Data Mining	CS – 311	3+0

Program Summary BS (CS)	
Duration of Program	4 Years
Number of Semesters	8
Average number of courses per semester	5 or 6
Total Credit Hours	135
Total Number of Courses	41 + Final Year Project (Part – I and II)