

### 2.2.3. PROGRAM STRUCTURE

The B.Sc. Computer Science is offered by Namal College in line with the Department of Computer Science, part of University of Engineering and Technology, Lahore. It is a four year program comprises of eight semesters. During each semester a number of core and elective courses are offered from different knowledge areas ranging from management sciences, mathematics and humanities apart from the core computer science courses.

Course Code	Course Title	Cr. Hrs		Knowledge Area	Pre-requisites
		Th	Lab		
<b>Semester 1</b>					
MA-123	Calculus	3	0	Natural Sciences	None
PHY-121 & 121L	Mechanics & Wave Motion	2	1	Natural Sciences	None
IS-101	Islamic/ Ethics & Pakistan Studies I	3	0	Humanities	None
CS-141 & 141L	Introduction to Computing	3	1	Computing	None
ME-100L	Workshop Practice	0	1	Interdisciplinary Engg	None
	English	0	0	Humanities	None
<b>Sub Total</b>		<b>11</b>	<b>2</b>		
<b>Semester 2</b>					
MA-224	Multivariate Calculus	3	0	Natural Science	MA-123
CS-142 & 142L	Programming Fundamentals	3	1	Computing	CS-141 & 141L
CSE-121 & 121L	Circuit Analysis I	3	1	CS Foundation	MA-123
IS-201	Islamic/ Ethics & Pakistan Studies II	3	0	Humanities	IS-101
PHY-131 & 131L	Electricity and Magnetism	2	1	Natural Sciences	None
<b>Sub Total</b>		<b>14</b>	<b>3</b>		
<b>Semester 3</b>					
MA-219	Linear Algebra and Complex Analysis	3	0	Natural Sciences	None
HU-221	Technical Writing & Presentation Skills	3	0	Humanities	None
CS-241 & 241L	Object Oriented Programming	3	1	Computing	CS-142 & 142L

<b>CS-211</b>	Discrete Mathematical Structures	3	0	Major Based Core	MA-123
<b>CSE-221 &amp; 221L</b>	Digital Logic Design	3	1	CS Foundation	CS-141
<b>Sub Total</b>		<b>15</b>	<b>2</b>		
<b>Semester 4</b>					
<b>MA-225</b>	Differential Equations and Transforms	3	0	Natural Sciences	MA-123
<b>CS-212 &amp; 212L</b>	Data Structures and Algorithms	3	1	Major Based Core	CS-211, CS-142 & 142L
<b>CSE-222 &amp; 222L</b>	Computer Organization and Assembly	3	1	Major Based Core	CSE-221 & 221L
<b>CS-281 &amp; CS-281L</b>	Object Oriented Analysis and Design	3	1	Major Based Core	CS-142 & CS-142L
<b>CS-201 &amp; CS-201L</b>	Numerical Analysis	3	1	Major Based Core	MA-123, CS-141 & 141L
<b>Sub Total</b>		<b>15</b>	<b>4</b>		
<b>Semester 5</b>					
<b>CSE-301</b>	Probability and Random Variables	3	0	Major Based Core	MA-224
<b>HU-111L</b>	Communication Skills	0	1	Humanities	None
<b>CS-312</b>	Theory of Automata & Formal Languages	3	0	CS Foundation	CS-211
<b>CS-381 &amp; 381L</b>	Software Engineering	3	1	Major Based Core	CS-241 & CS-241L, CS-212
<b>CS-361 &amp; 361L</b>	Artificial Intelligence	3	1	Major Based Core	CS-211, CS-212
<b>CS-311</b>	Analysis of Algorithms	3	0	CS Foundation	CS-211, CS-212 & CS-212L
<b>Sub Total</b>		<b>15</b>	<b>3</b>		

Semester 6					
<b>MGT-XXX</b>	Project Management	3	0	Management Sciences	None
<b>CS-362 &amp; 362L</b>	Operating Systems	3	1	CS Foundation	CSE-222, CS-212
<b>CSE-331 &amp; 331L</b>	Computer Networks	3	1	CS Foundation	CS-212 & 212L
<b>CS-382</b>	Web Technologies	3	0	Major Based Core	CS-212 & 212L
<b>CS-363 &amp; 363L</b>	Database Systems	3	1	Major Based Core	CS-212 & 212L
<b>Sub Total</b>		<b>15</b>	<b>3</b>		
Semester 7					
<b>MGT-414</b>	Entrepreneurship and Business Management	3	0	Management Sciences	None
<b>CSE-421</b>	Computer Architecture	3	0	Major Based Core	CSE-222 & 222L
	CS/ CSE Elective	3	0	Major Based	CSE-371
	CS/ CSE Elective	2	1	Major Based	None
<b>CSE-491</b>	FYP I	0	3	Final Year Design Project	None
<b>Sub Total</b>		<b>11</b>	<b>4</b>		
Semester 8					
<b>XX-XXX</b>	International language	3	0	Humanities	None
<b>CS-411</b>	Compiler Construction	3	0	Major Based Core	CS-312
	CS/ CSE Elective	3	0	Major Based	None
	CS/ CSE Elective	2	1	Major Based	None
<b>CSE-492</b>	FYP II	0	3	Final Year Design Project	None
<b>Sub Total</b>		<b>11</b>	<b>4</b>		
Total Credit Hours: 133					

## 2.2.4 POSSIBLE ELECTIVES

<i>Subject Code</i>	<i>Subject Name</i>	<i>Th</i>	<i>Lab</i>	<i>Prerequisites</i>
<i>CSE-223</i>	Circuit Analysis II	3	0	CSE-121
<i>CSE-422 &amp; 422L</i>	Digital design	2	1	CSE-222
<i>CSE-302</i>	Control Systems	3	0	CSE-371, MA-219
<i>CSE-323</i>	Electronics II	3	0	CSE-321
<i>CSE-371</i>	Signals and Systems	3	0	CSE-121, MA 225, MA 219
<i>CSE-423 &amp; 423L</i>	Industrial Automation	2	1	CSE-221
<i>CS-462</i>	Data Mining	3	0	CS 363& 363L
<i>CS-401</i>	Computer Graphics	3	0	CS 212 & 212L
<i>CS-445</i>	Programming Languages	3	0	CS312, CS 212 & 212L
<i>CS-463</i>	Bioinformatics	3	0	CS 363& 363L
<i>CS-464</i>	Machine Learning	3	0	CS-361 & 361L
<i>CS-461</i>	Management Information Systems	3	0	CS 363& 363L
<i>CS-441</i>	Mobile Application Development	3	0	CS-241 & 241L, CS 212& 212L
<i>CS-442</i>	Parallel Programming	3	0	CS 362 & CS362L
<i>CSE-473</i>	Digital Image Processing	3	0	CSE-371
<i>CS-465</i>	Data Warehousing	3	0	CS 362 & CS362L, CS 331& 331L
<i>CSE-424</i>	Robotics and CNC Machines	2	1	CSE-322 & CSE-322L
<i>CS-481</i>	Design Patterns	3	0	CS-381 & CS-381L
<i>CSE-466</i>	Computer Vision	3	0	CS-361 & CS-361L
<i>CS-467</i>	Ubiquitous Computing	3	0	CS 331& CS 331L
<i>CSE-472</i>	Communication Systems and Wireless	3	0	CS 331& CS 331L, CSE 371
<i>CSE-432</i>	Internetworking with UNIX TCP/IP	3	0	CS 331& 331L
<i>CSE-431</i>	Wireless Networks	3	0	CS 331& 331L
<i>CSE-471</i>	Digital Signal Processing	2	1	CSE 371