

## Undergraduate Course Scheme (Applicable from 2020 Session)

**Nature of Academic Session:** Undergraduate

**Number of Semesters:** 8

**Duration:** 4 years

**Total Courses:** 45

**Total Credit Hours:** 135

### Semester 1

Course Code	Course Title	Credit Hrs	Prerequisites
CS-161	Programming Fundamentals	3-1	None
CS-102	Introduction to Computing	3-1	None
HU-102	Functional English	3-0	None
MA-123	Calculus	3-0	None
PHY-111	Applied Physics	2-1	None
ME-100L	Workshop Practice	0-1	None
<b>Total Credit</b>		<b>14-4</b>	

### Semester 2

Course Code	Course Title	Credit Hrs	Prerequisites
CS-162	Object Oriented Programming	3-1	Programming Fundamentals
CMPE-222	Digital Logic Design	3-1	Applied Physics
HU-240	Psychology	3-0	None
HU-111L	Communication Skills (Lab)	0-1	None
MA-224	Multi-Variate Calculus	3-0	Calculus
MA-343	Applied Probability & Statistics	3-0	None
IS-XXX	Quran Translation I	1-0	None
<b>Total Credit</b>		<b>16-3</b>	

### Semester 3

Course Code	Course Title	Credit Hrs	Prerequisites
CS-261	Data Structures and Algorithms	3-1	Object Oriented Programming
HU-221	Technical Writing and Presentation Skills	3-0	None
CS-271	Computer Organization and Assembly Language	3-1	Digital Logic Design, Programming Fundamentals
MA-234	Linear Algebra	3-0	None
CS-261	Discrete Mathematics	3-0	None
<b>Total Credit</b>		<b>15-2</b>	

### Semester 4

Course Code	Course Title	Credit Hrs	Prerequisites
CS-262	Database Systems	3-1	Data Structures and Algorithms
CS-263	Operating Systems	3-1	Data Structures and Algorithms
MA-228	Differential Equations	3-0	Multi-Variate Calculus
CS-272	Design and Analysis of Algorithms	3-0	Data Structures and Algorithms
CS-273	Theory of Automata	3-0	Discrete Mathematics
IS-XXX	Quran Translation II	1-0	None
<b>Total Credit</b>		<b>16-2</b>	

### Semester 5

Course Code	Course Title	Credit Hrs	Prerequisites
CS-364	Information Security	3-0	Discrete Mathematics
CS-371	Artificial Intelligence	3-1	Data Structures and Algorithms
CS-301	Professional Practices in Software Development	3-0	None
CS-39x	Computer Science Elective-1	3-0	None
CS-165	Software Engineering	3-1	None
<b>Total Credit</b>		<b>15-2</b>	

## Semester 6

Course Code	Course Title	Credit Hrs	Prerequisites
CS-373	Computer Networks	3-1	Operating Systems
CS-39x	Computer Science Elective-2	3-0	
CS-39x	Computer Science Elective-3	3-0	
CS-380	Graph Theory	3-0	Discrete Mathematics
CS-372	Parallel and Distributed Computing	3-0	Operating Systems
IS-XXX	Quran translation III	1-0	None
<b>Total Credit</b>		<b>16-1</b>	

## Semester 7

Course Code	Course Title	Credit Hrs	Prerequisites
CS-465	Final Year Project-I	0-3	None
CS-471	Compiler Construction	3-1	Theory of Automata and Formal Languages, Data Structures and Algorithms
CS-49x	Computer Science Elective-4	3-0	
IS-101	Islamic & Pakistan Studies-I	3-0	None
CS-49x	Computer Science Elective-5	3-0	

## Semester 8

Course Code	Course Title	Credit Hrs	Prerequisites
CS-466	Final Year Project-II	0-3	Final Year Project-I
MGT-414	Entrepreneurship & Business Management	3-0	None
IS-201	Islamic & Pakistan Studies-II	3-0	None
HU-XXX	International Language	0-0	None
MGT-424	Leadership Strategies	3-0	
IS-XXX	Quran translation IV	1-0	None
<b>Total Credit</b>		<b>12-4</b>	

## List of Computer Science Elective Courses

Course Code	Course Title	ACM Knowledge Area
CS-381	Computer Architecture	Architecture & Organization
CS-481	Real Time Systems	Architecture & Organization
CS-382	Operations Research	Computational Science
CS-383	Simulation and Modelling	Computational Science
CS-384	Introduction to Data Science	Data Science
CS-385	Internet of Things	Data Science
CS-482	Big Data Analytics	Data Science
CS-483	Cloud Computing	Data Science
CS-386	Database Administration	Databases
CS-387	Database Performance & Optimization	Databases
CS-388	Database Backup & Recovery	Databases
CS-389	Distributed Databases	Databases
CS-484	Data Warehousing	Databases
CS-581	Graph Databases	Databases
CS-582	Web Semantics	Databases
CS-351	Computer Graphics	Graphics & Vision
CS-485	Computer Vision and Image Processing	Graphics & Vision
SE-325	UX/UI Design	HCI
SE-221	Human Computer Interaction	HCI
CS-487	Ethical Hacking	Information Assurance & Security
CS-353	Management Information Systems	Information Management
CS-488	Information Retrieval	Information Management
CS-354	Natural Language Processing	Intelligent Systems
CS-355	Data Mining	Intelligent Systems
CS-489	Machine Learning	Intelligent Systems
CS-490	Soft Computing	Intelligent Systems
CS-491	Wireless Networks	Networking and Communications
CS-492	Internetworking with Unix TCP/IP	Networking and Communications
CS-390	System Programming	Operating Systems
CS-391	Web Technologies	Platform Based Development
CS-392	Game Development	Platform Based Development
CS-393	Open Source Software Development	Platform Based Development

<b>Course Code</b>	<b>Course Title</b>	<b>ACM Knowledge Area</b>
CS-493	Enterprise Application Development	Platform Based Development
CS-394	Mobile Application Development	Platform Based Development
CS-494	E-Commerce	Platform Based Development
CS-395	Introduction to Programming Languages	Programming Languages Fundamentals
CS-396	Object Oriented Analysis and Design	Software Design
CS-397	Design Patterns	Software Design
CS-495	Software Design & Architecture	Software Design
SE-211	Software Requirements Engineering	Software Engineering
SE-331	Software Quality Engineering	Software Engineering
SE-332	Software Measurement & Metrics	Software Engineering
CS-497	Intro to Program Analysis	Software Engineering
CS-498	Formal Methods	Software Engineering
SE-442	Software Re-Engineering	Software Engineering
SE-441	Software Project Management	Software Project Management
CS-583	Leading Software Teams	Software Project Management
CS-584	Habits of Highly Effective Software Engineer	Software Project Management
CS-585	Personal, Team and Executive Software Processes	Software Project Management
CS-586	Logical Paradigms of Computing	Theoretical Computer Science