Scheme of Study for Master of Computer Science (MCS)

2-year program (4 Regular Semesters of 18 weeks each)

#	Category	# of Courses	Credit Hours
1	**Computing Core Courses** (Comp-Core)	**10**	**39**
2	**Computer Science (CS) Courses**	**9**	**30**
	CS Core Courses (CS-Core)	6	21
	CS Elective Courses (CS-Elec)	3	9
3	**University Electives** (Univ-Elec)	**1**	**3**
	Total	**20**	**72**

Semester-I: (17 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Pre-Requisite
1	CS-301	Comp-Core	Introduction to ICT	3 (2,1)	
2	CS-303	Comp-Core	Programming Fundamentals	4 (3,1)	
3	CS-305	Comp-Core	Discrete Structures	3 (3,0)	
4	CS-307	CS-Core	Digital Logic Design	4 (3,1)	
5	* 309	Univ-Elec	University Elective	3 (3,0)	

Semester-II: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Pre-Requisite
1	CS-302	Comp-Core	Operating Systems	4 (3,1)	
2	CS-304	Comp-Core	Object Oriented Programming	4 (3,1)	Programming Fundamentals
3	CS-306	Comp-Core	Database Systems	4 (3,1)	
4	CS-308	Comp-Core	Software Engineering	3 (3,0)	
5	CS-310	CS-Core	Theory of Automata	3 (3,0)	

Semester-III: (18 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Pre-Requisite
1	CS-401	Comp-Core	Computer Networks	4 (3,1)	
2	CS-403	Comp-Core	Data Structures and Algorithms	4 (3,1)	
3	CS-405	CS-Core	Computer Organization & Assembly Language	4 (3,1)	
4	CS-407	CS-Elec	CS Elective – I	3(2,1)	
5	CS-409	CS-Elec	CS Elective – II	3 (2,1)	

Semester-IV: (19 Credit Hours)

#	Course Code	Category	Course Title	Credit Hours	Pre-Requisite
1	CS-402	CS-Core	Design & Analysis of Algorithms	3 (3,0)	
2	CS-404	CS-Core	Compiler Construction	3 (3,0)	
3	CS-406	CS-Core	Artificial Intelligence	4 (3,1)	Discrete Structures
4	CS-408	CS-Elec	CS Elective – III	3 (3,0)	
5	CS-412	Comp-Core	Final Year Project	6 (0,6)	

** Two alphabetic characters (EG or MG or SS) to be used for the respective course from the university elective course list.*

Electives for MCS

CS Elective Courses:

#	Category	Course Title	Credit Hours	Prerequisites
1	CS-Elec	Computer Graphics	2-1	Programming Fundamentals
2	CS-Elec	Digital Image Processing	2-1	Data Structures & Algorithm
3	CS-Elec	Visual Programming	2-1	Programming Fundamentals
4	CS-Elec	Distributed Computing	2-1	Operating Systems
5	CS-Elec	Network Security	3-0	Data Comm. & Networks
6	CS-Elec	Computer Vision	3-0	
7	CS-Elec	Systems Programming	2-1	Operating Systems
8	CS-Elec	Distributed Database Systems	2-1	Intro. to Database Systems
9	CS-Elec	Data Warehousing	3-0	Intro. to Database Systems
10	CS-Elec	Web Engineering	2-1	Programming Fundamentals
11	CS-Elec	Web Design and Development	2-1	Programming Fundamentals
12	CS-Elec	Artificial Neural Networks	2-1	Discrete Structures
13	CS-Elec	Expert Systems	2-1	Discrete Structures
14	CS-Elec	Fuzzy Logic System	2-1	Discrete Structures
15	CS-Elec	Operations Research	3-0	
16	CS-Elec	Network Programming	2-1	Data Comm. & Networks
17	CS-Elec	Wireless Networks	3-0	Data Comm. & Networks
18	CS-Elec	Telecommunication Systems	2-1	Data Comm. & Networks
19	CS-Elec	Mobile Computing	2-1	Data Comm. & Networks
20	CS-Elec	Mobile Application and Development	3-0	Programming Fundamentals
21	CS-Elec	Java Programming	2-1	Programming Fundamentals
22	CS-Elec	Android Programming	2-1	
23	CS-Elec	Cloud Computing	2-1	
24	CS-Elec	Cyber Security	3-0	
25	CS-Elec	Object-Oriented Analysis & Design	3-0	Intro to Software Engg
26	CS-Elec	Ethical Hacking	2-1	
27	CS-Elec	Social Computing	3-0	
28	CS-Elec	Computational Intelligence	3-0	Discrete Structures
29	CS-Elec	Multi-Agent Systems	3-0	Data Comm. & Networks
30	CS-Elec	Natural Language Processing	3-0	Discrete Structures
31	CS-Elec	Game Development	3-0	Object-Oriented Programming
32	CS-Elec	Logical Paradigms of Computing	3-0	Discrete Structures
33	CS-Elec	Principles of Programming Languages	3-0	Programming Fundamentals
34	CS-Elec	Formal Methods in Software Engineering	3-0	Discrete Structures
35	CS-Elec	Fundamentals of Data Mining	3-0	Intro to Database Systems
36	CS-Elec	Computer Architecture	3-0	
37	CS-Elec	Parallel and Distributed Computing	2-1	Operating Systems

University Elective Courses:

#	*Course Code*	*Category*	*Course Title*	*Credit Hours*
1	EG	Univ-Elec	Business Communications and Technical Writing	3 (3,0)
2	MG	Univ-Elec	Financial Accounting	3 (3,0)
3	MG	Univ-Elec	Financial Management	3 (3,0)
4	MG	Univ-Elec	Human Resource Management	3 (3,0)
5	MG	Univ-Elec	Marketing	3 (3,0)
6	SS	Univ-Elec	Psychology	3 (3,0)
7	SS	Univ-Elec	Foreign/Regional Languages (French, German, Chinese, Japanese, Russian, Sindhi, Punjabi, Balochi, Pashto etc.)	3 (3,0)