Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
MCA504	Distributed computing and Cloud Computing	4	-	--	4	-	--	4
		Examination Scheme						
		ISE		MSE	ESE			
		10		30	100 (60% Weightage)			

Pre-requisite Course Codes	Networking	
Course Outcomes	Student will be able to	
	CO1	Apply various process communication protocols to Distributed Systems.
	CO2	Compare different algorithms of Distributed Systems.
	CO3	Solve the different issues of Distributed System Management.
	CO4	Analyze the latest trends Service oriented architecture, Cloud Services.
	CO5	Analyze different Cloud models for its implementation.
	CO6	Demonstrate various Cloud Technologies.

Module No.	Unit No.	Topics	Ref.	Hrs.
1		**Introduction to Distributed Computing Concepts**	1,3	3
	1.1	Basic concepts of distributed systems		
	1.2	Distributed computing models		
	1.3	Software concepts, issues in designing distributed systems		
	1.4	Client server model and current case studies of the World Wide Web 1.0 and World Wide Web 2.0.		
2		**Inter Process Communication Fundamental concepts**	1,3	5
	2.1	Related to inter process communication including message-passing mechanism		
	2.2	Case study on IPC in MACH		
	2.3	Concepts of group communication and case study of group communication CBCAST in ISIS,		
	2.4	API for Internet Protocol		
3		**Formal Model Specifications and Remote Communication**	1,3	5
	3.1	Basic concepts of formal model definitions		
	3.2	Different types of communication systems		
	3.3	algorithms for message passing systems		
	3.4	Basic concept of middleware		
	3.5	Remote Procedural Call (RPC)		
	3.6	Case study on Sun RPC, Remote Method Invocation (RMI) along with a case study on Java RMI.		
4		**Clock synchronization**	1,3	3
	4.1	clock synchronization		

	4.2	physical and logical clocks,		
	4.3	global state mutual Exclusion algorithms election algorithms		
5	5.1	Distributed System Management Resource management	1,3	5
	5.2	process management		
	5.3	threads, and fault tolerance		
6	6.1	Distributed Shared Memory Fundamental concepts of DSM	1,3	5
	6.2	types of DSM		
	6.3	various hardware DSM systems		
	6.4	Consistency models		
	6.5	issues in designing and implementing DSM systems		
7	7.1	Distributed File System Concepts of a Distributed File System (DFS)	1,3	4
	7.2	file models		
	7.3	issues in file system design		
	7.4	naming transparency and semantics of file sharing		
	7.5	techniques of DFS implementation		
8	8.1	Advances in Distributed Computing (SOA & Cloud Computing) Service-Oriented Architecture	6,7	4
	8.2	Elements of Service-Oriented Architectures, RPC versus Document Orientation		
	8.3	Major Benefits of Service- Oriented Computing, Composing Services, Goals of Composition		
	8.4	Challenges for Composition, Spirit of the Approach		
9	9.1	Fundamentals of Cloud computing	6,7	2
	9.2	Evolution of Cloud Computing, cluster computing Grid computing		
	9.3	Grid computing versus Cloud Computing, Key Characteristics of cloud computing		
10	10.1	Cloud models Benefits of Cloud models,Public Cloud	6,7	4
	10.2	Private Cloud, Hybrid Cloud, Community Cloud, Shared Private Cloud		
	10.3	Dedicated Private Cloud, Dynamic Private Cloud, Savings and cost impact Web services delivered from cloud		
	10.4	Platform as a service,Software as a service, Infrastructure as a service		
11	11.1	Cloud Security Fundamentals Privacy and security in cloud	7,8	5
	11.2	Security architecture		
	11.3	Data security		
	11.4	Identity and access management		
	11.5	security challenges		
12	12.1	Implementation of Cloud Technologies, Introduction to Cloud Technologies	7,8	
	12.2	Hypervisor,Web services, AJAX		
	12.3	MASHUP, Hadoop,Map reduce		
	12.4	Virtualization Technologies, Virtual Machine Technology		
	12.5	Cloud data center, Case studies : Google, Microsoft, Amazon		
			Total	**45**

References:

[1] Dr. SunitaMahajan , Seema Shah “Distributed Computing” Oxford University Press
[2] Tanenbaum S “Distributed Operating Systems”, Pearson Education
[3] Pradeep K. Sinha “Distributed OS”, PHI
[4] George Coulouris, Jean Dollimore, Tim Kindberg, Addison-Wesley “Distributed Systems concepts and design”
[5] Anthony T. Velte, Robert Elsenpeter“Cloud Computing a Practical Approach”, TMH
[6] Dr. Kumar Saurabh“Cloud Computing insights into new-era infrastructure”, Wiley India
[7] John W. Rittinghouse“Cloud Computing implementation, management and security”James F. Ransome, CRC Press, Taylor & Francis group, 2010.
[8] Shivanandan“Distributed Computing Architecture”
[9] George Reese “Cloud Application Architecture”,O’reilly and associates