Course code: Course Title	Course Structure			Pre-Requisite
SE412: Cloud Computing	L	T	P	NIL
	3	1	0	

Course Objective: To study the concepts, architecture, models of a cloud and its security issues and service management parameters.

S. NO	Course Outcomes (CO)
CO1	Explain fundamental concepts of cloud computing, its evolution, computing paradigms, and service providers.
CO2	Illustrate cloud computing architectures, service models (IaaS, PaaS, SaaS), and deployment models for various applications.
CO3	Apply virtualization techniques, resource provisioning, and storage management to optimize cloud infrastructure.
CO4	Formulate cloud service management techniques, scalability, SLAs, and economic considerations for efficient cloud solutions.
CO5	Design secure cloud environments by implementing data security, access control, and identity management mechanisms.

S. NO	Contents	Contact Hours
UNIT 1	**Introduction:** Overview of Computing Paradigm and introduction to cloud computing: Recent trends in Computing (Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing), Evolution of cloud computing(Business driver for adopting cloud computing), Cloud Computing (NIST Model) , Cloud service providers, Properties, Characteristics & Disadvantages, Cloud computing vs. Cluster computing vs. Grid computing, Role of Open Standards	8
UNIT 2	**Cloud Computing Architecture:** Cloud computing stack: Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services, Service Models (XaaS) :Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), Deployment Models(Public cloud, Private cloud, Hybrid cloud, Community cloud)	6
UNIT 3	**Infrastructure as a Service(IaaS):** Introduction to IaaS ,IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM),Resource Virtualization(Server, Storage, Network), Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage in cloud computing(storage as a service)	6
UNIT 4	**Platform as a Service(PaaS):** Introduction to PaaS, Service Oriented Architecture (SOA), Cloud Platform and Management (Computation,Storage) Examples: Google App Engine ,Microsoft Azure, SalesForce.com Software as a Service(SaaS): Introduction to SaaS, Web services, Web 2.0, Web OS,Case Study on SaaS	8
UNIT 5	**Service Management in Cloud Computing:** Service Level Agreements(SLAs) (Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud , Economics of scaling: Benefitting enormously,	8

	Managing Data, Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing	
UNIT 6	**Cloud Security:** Infrastructure Security(Network level security, Host level security, Application level security), Data security and Storage (Data privacy and security Issues, Jurisdictional issues raised by Data location), Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations	**6**
	TOTAL	**42**

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Barrie Sosinsky, "Cloud Computing Bible", Wiley, 1st Edition.	**2011**
2	Rajkumar Buyya, James Broberg, Andrzej Gos'cinski, "Cloud Computing: Principles and Paradigms", Wiley, 1st Edition.	**2013**
3	Nikos Antonopoulos, Lee Gillam, "Cloud Computing: Principles, Systems and Applications (Computer Communications and Networks)", Springer London Ltd, 1st Edition.	**2012**
4	Ronald L. Krutz, Russell Dean Vines, "Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley, 1st Edition.	**2010**