CS **Architectural Support for Cloud Infrastructure**

Objectives
- To define Cloud Computing
- To shed light on the Security issues in Cloud Computing
- To provide an in-depth knowledge in cloud architecture
- Provide knowledge about different security architectures for cloud server

UNIT I
Cloud Computing -Technical Aspects of Cloud Computing -Security Aspects of Cloud Computing, Ongoing and Future Elements in Cloud Computing , Adoption of Cloud Computing Industry Drivers , Virtualization- Types of Virtualization, History of Virtualization, Virtualization Architecture, Virtual Machine Monitor, Examples of Virtual Machines.

UNIT II
Security Design in the Cloud, The Truth about Data in the Cloud, How Much Security Is Required, Responsibilities for Each Cloud Service Model, Security Strategies.

UNIT III
Case studies: Xen- The Xen Virtual Machine, The State of Virtualization, Exploring the Xen Virtual Architecture, Hype-V- Introduction to Hyper-V, Virtualization Best Practices, Hyper-V Security.

UNIT IV
HyperCheck: A Hardware-Assisted Integrity Monitor, A Trusted Virtual Machine in an Untrusted Management Environment, A Trusted Virtual Machine in an Untrusted Management Environment, Quantitative survivability evaluation of three virtual machine-based server architectures.

UNIT V
Characterizing Hypervisor Vulnerabilities in Cloud Computing Servers, PHANTOM: Practical Oblivious Computation in a Secure Processor, Multi-Processor Architectural Support for Protecting Virtual Machine Privacy in Untrusted Cloud Environment, Architectural Support of Multiple Hypervisors over Single Platform for Enhancing Cloud Computing Security, A Server-Side Solution to Cache-Based Side-Channel Attacks in the Cloud, Design Space Exploration and Optimization of Path Oblivious RAM in Secure Processors.

Outcome
- Provide the architectural view of cloud server
- Understanding Secure processor architectures for cloud server

Text Books
1. Shuangbao Paul Wang, Robert S. Ledley, "Computer Architecture and Security: Fundamentals of Designing Secure Computer Systems" John Wiley & Sons, 2012.
2. Michael J. Kavis, "Architecting the Cloud" Wiley, 2014.
3. David Chisnall, "The Definitive Guide to the Xen Hypervisor", Prentice Hall, 2008.
4. John Kelbley, Mike Sterling, Allen Stewart, "Windows Server Hyper-V Insider's Guide to Microsoft's Hypervisor", Wiley 2008.
5. David.A.Patterson, John L.Hennessy, "Computer Architecture: A Quantitative approach", Elsevier, 5th Edition 2012.