

COURSE CODE	COURSE TITLE	L	T	P	C
1152IT141	Cloud Security	3	0	0	3

Unit I

Security Concepts: Confidentiality, privacy, integrity, authentication, non-repudiation, availability, access control, defence in depth, least privilege, how these concepts apply in the cloud, what these concepts mean and their importance in PaaS, IaaS and SaaS. e.g. User authentication in the cloud; Cryptographic Systems: Symmetric cryptography, stream ciphers, block ciphers, modes of operation, public-key cryptography, hashing, digital signatures, public-key infrastructures, key management, X.509 certificates, OpenSSL.

Unit II

Multi-tenancy Issues: Isolation of users/VMs from each other. How the cloud provider can provide this; Virtualization System Security Issues: e.g. ESX and ESXi Security, ESX file system security, storage considerations, backup and recovery; Virtualization System Vulnerabilities: Management console vulnerabilities, management server vulnerabilities, administrative VM vulnerabilities, guest VM vulnerabilities, hypervisor vulnerabilities, hypervisor escape vulnerabilities, configuration issues, malware (botnets etc).

Unit III

Virtualization System-Specific Attacks: Guest hopping, attacks on the VM (delete the VM, attack on the control of the VM, code or file injection into the virtualized file structure), VM migration attack, hyperjacking.

Unit IV

Technologies for Virtualization-Based Security Enhancement: IBM security virtual server protection, virtualization-based sandboxing; Storage Security: HIDPS, log management, Data Loss Prevention. Location of the Perimeter.

Unit V

Legal and Compliance Issues: Responsibility, ownership of data, right to penetration test, local law where data is held, examination of modern Security Standards (eg PCIDSS), compliance for thecloud provider vs. compliance for the customer.

TEXT / REFERENCES BOOKS

1. Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance [ISBN: 0596802765]
2. Ronald L. Krutz, Russell Dean Vines, Cloud Security [ISBN: 0470589876]
3. John Rittinghouse, James Ransome, Cloud Computing [ISBN: 1439806802]
4. J.R. ("Vic") Winkler, Securing the Cloud [ISBN: 1597495921]
5. Cloud Security Alliance 2009, Security Guidance for Critical Areas of Focus in Cloud Computing
6. vmwareVMware Security Hardening Guide
7. Cloud Security Alliance 2010, Top Threats to Cloud Computing
8. NIST Guidelines on Security and Privacy in Public Cloud Computing
9. William Hau, Rudolph Araujo et al How Virtualization Affects PCI DSS www.mcafee.com/us/resources/.../wp-how-virt-affect-pci-dss-part-1.pdf
10. Chenxi Wang Compliance with Clouds: Caveat Emptor