



SILVER OAK UNIVERSITY
Silver Oak College of Computer Application
Master of Science Cyber Security & Digital Forensics
Course Name: Cloud Security
Course Code: 1040147237
Semester: 3rd

Prerequisite: Proficiency in virtualization technologies, networking principles, and fundamental cloud architecture concepts.

Course Objective: Students will enhance knowledge of cloud security compliance management and perform vulnerability assessment and penetration testing on the cloud.

Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
3	1	0	4	4

Contents:

Unit No.	Course Contents	Teaching Hours	% Weightage
1	Introduction to Cloud Computing: Cloud Computing definition, private, public and hybrid cloud, Cloud types; IaaS, PaaS, SaaS, Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud, Business Agility: Benefits and challenges to Cloud architecture, Application availability, performance, security and disaster recovery, next generation Cloud Application	10	24
2	Cloud Application Architecture and security: Technologies and the processes required when deploying web services, Deploying a web service inside and outside a cloud architecture - advantages and disadvantages.	10	24
3	Implementing Cloud Application, Services and security: Reliability, availability and security of services deployed from the cloud, Performance and scalability of services - Cloud Economics, Cloud Computing infrastructures available for implementing cloud based services, Cloud security controls, Dimensions of cloud security, Cloud Vulnerability and Penetration Testing Data security, Encryption, Compliance	11	26

4	<p>Cloud Application Development & IT Model & Importance of Cloud Technology in Corporates:</p> <p>Service creation environments to develop cloud-based applications, Development environments of service development; Amazon, Azure, Google App, Applicability of laws to data stored outside the nation's boundary, Economics of choosing a Cloud platform for an organization - Based on application requirements, economic constraints and business needs - Discuss industry cases including open sources.</p>	6	14
5	<p>Advanced Techniques for Setting Up Secure Cloud Environments</p> <p>Infrastructure as Code (IaC) for security automation, Advanced network security configurations, Multi-cloud and hybrid cloud security strategies, Advanced Identity and Access Management (IAM), Fine-grained access controls and policy management, Federated identity management and single sign-on (SSO), Implementing least privilege and zero trust models, Advanced Data Security in the Cloud, End-to-end encryption strategies and key management, Data classification and handling policies, Secure data lifecycle management and compliance</p>	5	12

Course Outcomes:

Sr. No.	CO Statement	Unit No
CO-1	Analyze the fundamentals of Cloud Computing, distinguishing between private, public, and hybrid clouds.	1
CO-2	Evaluate the architecture and security aspects of Cloud Applications, synthesizing deployment strategies and associated risks.	2
CO-3	Implement Cloud Application Services, emphasizing reliability, availability, scalability, and security measures.	3
CO-4	Analyze Infrastructure as Code, advanced network security, multi-cloud strategies, and Identity and Access Management for secure cloud environments.	4,5

Teaching & Learning Methodology:

1. Design Thinking
2. Cooperative-based Learning
3. Competency-based Learning
4. Problem - based Learning

List of Tutorials:**Total Hours: 14**

Sr. No.	Tutorial Name
1	Building: Deploying JAVA/NODE.js based application on public cloud-based application
2	Perform: Blackbox penetration testing on Cloud applications to get access to internal cloud resources.
3	Perform: cloud configuration review on a public cloud platform
4	Perform: vulnerability assessment on EC2 container using Nessus.
5	Perform: vulnerability assessment on Docker using Nessus.
6	Perform: signature rapping attacks and side channel attacks in cloud-based applications.
7	Security: Controls in Cloud and Tools used for Security Control Implementation
8	Configuring IAM roles and policies

Books Recommended:

1. Rittinghouse, J.W. & Ransome, J.F.Cl, "Computing: Implementation, Management, and Security", CRC Press
2. Vacca, J., "Cloud Computing Security: Foundations and Challenges". CRC Press
3. Rountree, D. & Castrillo, I., "The Basics Of Cloud Computing: Understanding The Fundamentals Of Cloud Computing In Theory And Practice", Syngress, Elsevier

CO-PO-PSO Matrix:

Co. No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO-1	3	2	2	1				1	2
CO-2	1	2	2	1	1			2	3
CO-3	1	2		2			1	2	3
CO-4	1	2	2	1				3	2