

<b>COURSE CODE</b>	<b>CLOUD WEB SERVICES</b>	<b>Total Lecture: 60 Theory: 45 Practical: 15</b>
<b>CA23CC003</b>		<b>(L-T-P = 3-0-2 = 4)</b>
<b>Course Objectives:</b> After studying this paper, the students will know – <ul style="list-style-type: none"> <li>● To Implement advanced multi-account strategies using AWS Organizations and service control policies</li> <li>● To Secure VPC using network ACLs, security groups, and AWS WAF</li> <li>● To Understand the data model and design efficient access patterns in RDS and DynamoDB</li> <li>● To Automate email client and device configuration for End User using Scripts.</li> <li>● To Integrate CloudTrail with AWS Config for compliance and security.</li> </ul>		
<b>Pre-requisite:</b>	<b>Basic understanding of cloud computing techniques.</b>	
<b>UNIT</b>	<b>CONTENT</b>	<b>HOURS</b>
<b>I</b>	<b>AWS Network Services</b> AWS Networking and Content Delivery, Application networking- Amazon VPC Lattice, design a solution that incorporates edge network services, optimize performance and traffic management for global architectures. Design DNS solutions that meet public, private, and hybrid requirements. Scale compute and network resources automatically, Configure high-bandwidth HTTP, HTTPS, and gRPC workloads.	<b>9</b>
<b>II</b>	<b>Security and Identity Services</b> Identity and Access Management (IAM), IAM roles, policies, and permission boundaries AWS Organizations: advanced multi-account strategies and service control policies, AWS Secrets Manager and AWS Systems Manager Parameter Store: managing secrets and configuration, AWS Key Management Service (KMS): advanced encryption key management, VPC security: network ACLs, security groups, and AWS WAF, Determine the use case for VPN or Direct Connect, enabling VPC Flow Logs, analyze the use of subnets and gateways for secure operation.	<b>9</b>
<b>III</b>	<b>AWS Database Services</b> Provisioning RDS instances: instance types, storage, and backups, read replicas: scaling read workloads and improving performance Database encryption: data at rest and in transit encryption options RDS Performance Insights: monitoring and optimizing database performance RDS parameter groups: fine-tuning database engine settings. Overview of DynamoDB: key-value and document database service, Understanding DynamoDB data model: tables, items, and attributes Primary keys and secondary indexes: designing efficient data access patterns, DynamoDB capacity modes: provisioned and on-demand.	<b>9</b>
<b>IV</b>	<b>End-user Computing Services</b> Introduction to Amazon Work Mail and its APIs, Scripting Work Mail organization and user management, automating email client and device configuration, Integration with other services using scripts, integrating end-user computing services with other AWS services, customizing, and extending functionality using scripts, Advanced troubleshooting and monitoring with scripts, automating compliance checks and audits for end-user computing services, Automating email client and device configuration	<b>9</b>

V	<b>Logging and Monitoring Services</b> Introduction to AWS CloudTrail: auditing and governance, Enabling and configuring CloudTrail for account activity tracking, Log file integrity validation and log file analytics, Using CloudTrail with AWS Config for compliance and security, Design and implement security monitoring and alerting, Design and implement a logging solution. Troubleshoot logging solutions. CloudWatch Synthetics: monitoring application endpoints, Configuring and managing canaries for proactive monitoring, monitoring multi-step workflows and API endpoints, Configure CloudWatch Synthetics for custom monitoring scenarios.	9
<b>List of Practicals-</b> 1. Create an AWS Organization with multiple accounts and set up a service control policy to restrict access between accounts. Securing VPC with Network ACLs and Security Groups: 2. Configure a VPC with subnets and security groups to allow specific inbound and outbound traffic. Set up a network ACL to control traffic flow between subnets. 3. Create an RDS instance with appropriate instance types, storage, and backups. Design a data model with primary keys and secondary indexes for efficient querying. 4. Create a DynamoDB table with appropriate primary keys and secondary indexes. Implement queries using key conditions and filters to retrieve data efficiently. 5. Use AWS SDKs or APIs to script the automation of email client and device configurations for end-users. Develop a script to automate the setup and configuration of email clients for a group of users. 6. Enable and configure CloudTrail to capture and log account activity and API calls. Integrate CloudTrail with AWS Config to enhance compliance and security monitoring. 7. Set up log groups and log streams in CloudWatch for specific services or applications. Configure log ingestion and retention settings. Create CloudWatch alarms to trigger notifications based on specific log events. 8. Create a CloudWatch Synthetics canary to monitor the availability and performance of an application endpoint. Configure canary scheduling, metrics, and alerts. 9. Create IAM roles, policies, and permission boundaries to manage access to AWS resources. Set up cross-account access using IAM roles and policies. Managing Secrets and Configuration with AWS Secrets Manager and Systems Manager. 10. Use Systems Manager Parameter Store to manage and retrieve configuration values. Implement secure access and encryption options for secrets and configuration data.		
<b>Course Outcomes as per Bloom's Taxonomy</b>		
CO 1	<b>Apply</b> service control policies (SCPs) to enforce fine-grained permissions across accounts.	
CO 2	<b>Configure</b> network ACLs to control inbound and outbound traffic at the subnet level.	
CO 3	<b>Design</b> primary keys and secondary indexes to optimize data access in RDS and DynamoDB.	
CO 4	<b>Develop</b> scripts to automate email client and device configuration for end-users.	
CO 5	<b>Implement</b> appropriate actions based on insights gained from CloudTrail and AWS Config logs.	
<b>Text Books:</b>	<ul style="list-style-type: none"> <li>Amazon Web Services, the Ultimate Guide for Beginners to Advance by Maverick Koston- 2018</li> <li>Amazon Web Services in Action – 8 October 2018 by Andreas Wittig, Michael Wittig - 2019</li> </ul>	
<b>Reference Books:</b>	<ul style="list-style-type: none"> <li>Solutions Architect's Handbook: Kick-start your career as a solutions architect by learning architecture design principles and strategies Paperback – Import, 17 January 2022 by Saurabh Shrivastava (Author), Neelanjali Srivastav (Author), Rajesh Sheth (Author), Rohan Karmarkar (Author), Kamal Arora (Author)</li> </ul>	