



SHARDA
UNIVERSITY
Beyond Boundaries



**SHARDA SCHOOL OF
COMPUTING SCIENCE
& ENGINEERING**



COURSE

Cloud Data Engineering with AWS

(NV61004)

VALUE ADDED
COURSE BROCHURE-30 HRS
2025-26

ABOUT THE UNIVERSITY

Sharda University envisions to serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship. It has 13,000+ students from 95+ countries, 29 states, and Union Territories, providing cultural diversity and global exposure to students. It has 26000+ alumni who are today leaders in their realms. Sharda University is **NAAC A+** University with Overall **NIRF Rank of 86**. Teaching Learning Center at Sharda University is to equip the faculty members with the expertise, skills and knowledge they need for capacity building of students. Teaching as a profession requires highly specialized skills and knowledge to impact significantly on student learning and therefore teachers must refine their conceptual and pedagogical skills.

ABOUT SCHOOL

Sharda School of Computing Science & Engineering is an open platform for diverse voices where teaching runs parallel to the real world and students are groomed to join the global workforce. SSCSE is distinguished as one of the top-ranked engineering schools in India. The students at SSCSE benefit through the professional grooming of renowned faculty and industry experts having experience of tackling pressing engineering problems. Students discover their passion in one of the various offered Engineering majors at the Sharda School of Computing Science & Engineering. A student-centric pedagogy, project-based approach and design-driven curriculum provides students with an inclination for complex problem solving, design, innovation, and a passion for learning.

ABOUT DEPARTMENT

The Department of Computer Science and Applications strives to equip faculty and students with all the computing resources needed to address a wide range of scientific, technological, and socially complex problems. The department imparts technical education for designing quirky technological applications and innovations. The department grails to become a center of excellence and impart knowledge to intellectual professionals so as to equip them with the requisite skills as per Industry standards. The department aims to foster an innovative research environment by providing a supportive, amiable, and challenge-based learning culture. The department utilizes high-performance computing equipment and facilities to impart state-of-the-art technical knowledge to students and instill a desire to pursue lifelong learning. To emerge as a world-class department, we focus on innovative research and quality learning in computer science applications that prepares entrepreneurs and professionals to lead the social, economic, and technical development of society. The department enjoys the full patronage of the Chancellor, Vice-Chancellor, Pro-Vice-Chancellor, and the Dean of the School of Engineering (SSCSE) where it is housed presently. The Value added Education Courses aim to provide additional learner centric graded skill oriented training, with the primary objective of improving the employability skills of students.

VALUE ADDED COURSE (VAC)

The Value added Education Courses aim to provide additional learner centric graded skill oriented training, with the primary objective of improving the employability skills of students. These courses bridge the gap between academic knowledge and industry expectations by equipping students with practical, hands-on expertise in emerging technologies and professional competencies.

PURPOSE OF VALUE ADDED COURSE

VACs are pertinent instructional strategies designed to close knowledge gaps in students and provide them a competitive edge in the job market. The courses' well-defined structure makes these VACs highly effective in enhancing students' employability quotient by developing diverse competencies. This Value-Added Course (VAC) on Cloud Data Engineering with AWS equips undergraduate students with the skills to build, manage, and optimize cloud-based data pipelines. Covering AWS fundamentals like EC2, S3, IAM, and billing tools, students gain expertise in data storage (S3, RDS, DynamoDB, Redshift), ETL operations with AWS Glue, and real-time streaming using Kinesis.

RESOURCE PERSON

Mr. Ankit Chauhan is an Embedded Systems and Linux Kernel Engineer with around 10 years of experience across industry and academia, including roles at Oracle and Tata Elxsi. He holds an M.S. in Automation and Robotics from TU Dortmund and a B.Tech in CSE from NIT Allahabad. A Goethe certified C2-level German speaker, he works fluently in both English- and German-speaking environments. His expertise spans low-level systems programming, Linux kernel development, and device drivers work across USB, I2C, SPI, and Ethernet subsystems.

COURSE SCHEDULE

Week	Topic	Duration Hrs.
1	Overview of cloud computing models: IaaS, PaaS, SaaS. AWS global infrastructure, regions, and availability zones.	2
2	Navigating the AWS Management Console and CLI. Introduction to AWS Identity and Access Management (IAM) for secure access control.	2
3	Introduction to AWS Identity and Access Management (IAM) for secure access control. Understanding AWS billing and cost management tools.	2
4	Amazon S3: Buckets, storage classes, lifecycle policies, and versioning. Amazon RDS: Relational databases, backups, and scaling.	2
5	Amazon DynamoDB: NoSQL database service, tables, and indexing. Amazon Redshift: Data warehousing concepts, clusters, and queries.	2
6	AWS Lake Formation: Building and managing data lakes. Creating and configuring S3 buckets with different storage classes.	2
7	Introduction to AWS Glue: Crawlers, Data Catalog, and Jobs. Creating and managing Glue Crawlers for schema discovery.	2
8	Developing ETL scripts using Python and Scala. Scheduling and monitoring Glue Jobs.	2
9	Integrating Glue with other AWS services like S3 and Redshift, Setting up Glue Crawlers to discover data in S3.	2
10	Overview of AWS Kinesis services: Data Streams, Data Firehose, and Data Analytics. Setting up Kinesis Data Streams and producers.	2
11	Processing streaming data with Kinesis Data Analytics. Integrating Kinesis with Lambda for real-time processing.	2
12	Delivering processed data to destinations like S3 and Redshift. Creating Kinesis Data Streams and configuring producers.	2
13	Designing scalable and reliable data pipelines using AWS services. Implementing orchestration with AWS Step Functions and Lambda.	2
14	Monitoring and logging with Amazon CloudWatch. Best practices for data pipeline security, error handling, and optimization.	2
15	Introduction to Infrastructure as Code (IaC) with AWS CloudFormation. Building a data pipeline that ingests, processes, and stores data.	2
Total		30 h

School: Sharda School of Computing Science & Engineering, (Department of Computer Science & Applications)			
Program: B.Tech IT		Semester: III	
Batch: 2024-28		Current Academic Year: 2025-26	
1. Course Code	NV61004		
2. Course Title	Cloud Data Engineering with AWS		
3. Credits	0		
4. Contact Hours (L-T-P)	30 Hours		
Course Type	Value added course		
5. Course Objective	The "Cloud Data Engineering with AWS" syllabus is designed to equip undergraduate students with the skills necessary to build, manage, and optimize data pipelines in the cloud using Amazon Web Services (AWS). The course begins with an introduction to cloud computing and AWS fundamentals, covering core services like EC2, S3, IAM, and billing tools. Students then delve into data storage solutions, learning to utilize Amazon S3, RDS, DynamoDB, and Redshift for scalable and secure data management. The curriculum progresses to data processing and ETL operations using AWS Glue, enabling students to automate data transformations and integrate diverse data sources. Real-time data streaming is explored through AWS Kinesis, teaching students to handle live data feeds and integrate them with other AWS services. The course culminates in designing end-to-end data pipelines, emphasizing orchestration, monitoring, and best practices for security and cost optimization. Hands-on labs and projects throughout the course ensure practical experience with AWS tools and services.		
6. Course Outcomes	After completion of this course, students will be able to: Co1: Demonstrate proficiency in navigating and utilizing AWS services for cloud data engineering tasks. Co2: Design and implement scalable data storage solutions using AWS services such as Amazon S3, RDS, DynamoDB, and Redshift. Co3: Develop and automate ETL pipelines using AWS Glue, ensuring efficient data transformation and integration. Co4: Build and manage real-time data streaming solutions using AWS Kinesis, integrating with other AWS services for real-time analytics. Co5: Design and orchestrate end-to-end data pipelines using AWS services like Step Functions, Lambda, and CloudFormation. Co6: Implement best practices in data security, governance, and cost optimization within AWS environments.		
7. Course Description	This course introduces students to the fundamentals of data visualization and equips them with hands-on skills in using two leading BI tools—Tableau and Power BI. Students will learn how to prepare, analyze, and present data visually to uncover insights and support decision-making. The course also covers dashboard development, tool comparison, and real-world applications through project-based learning.		
8. Outline syllabus			CO Mapping
Unit 1	Introduction to Cloud Computing and AWS		
A	Overview of cloud computing models: IaaS, PaaS, SaaS. AWS global infrastructure, regions, and availability zones.		CO1
B	Navigating the AWS Management Console and CLI. Introduction to AWS Identity and Access Management (IAM) for secure access control.		CO1
C	Introduction to AWS Identity and Access Management (IAM) for secure access control.Understanding AWS billing and cost management tools.		CO1
Unit 2	Data Storage Solutions on AWS		
A	Amazon S3: Buckets, storage classes, lifecycle policies, and versioning. Amazon RDS: Relational databases, backups, and scaling.		CO2
B	Amazon DynamoDB: NoSQL database service, tables, and indexing. Amazon Redshift: Data warehousing concepts, clusters, and queries.		CO2
C	AWS Lake Formation: Building and managing data lakes. Creating and configuring S3 buckets with different storage classes.		CO2
Unit 3	Data Processing and ETL with AWS Glue		
A	Introduction to AWS Glue: Crawlers, Data Catalog, and Jobs. Creating and managing Glue Crawlers for schema discovery.		CO3
B	Developing ETL scripts using Python and Scala. Scheduling and monitoring Glue Jobs.		CO3
C	Integrating Glue with other AWS services like S3 and Redshift, Setting up Glue Crawlers to discover data in S3.		CO3
Unit 4	Real-Time Data Streaming with AWS Kinesis		
A	Overview of AWS Kinesis services: Data Streams, Data Firehose, and Data Analytics. Setting up Kinesis Data Streams and producers.		CO4
B	Processing streaming data with Kinesis Data Analytics. Integrating Kinesis with Lambda for real-time processing.		CO4
C	Delivering processed data to destinations like S3 and Redshift. Creating Kinesis Data Streams and configuring producers.		CO4
Unit 5	Building End-to-End Data Pipelines and Best Practices		
A	Designing scalable and reliable data pipelines using AWS services. Implementing orchestration with AWS Step Functions and Lambda.		CO4
B	Monitoring and logging with Amazon CloudWatch. Best practices for data pipeline security, error handling, and optimization.		CO4
C	Introduction to Infrastructure as Code (IaC) with AWS CloudFormation. Building a data pipeline that ingests, processes, and stores data.		CO4
Mode of examination	Theory/ Practical	Weightage Distribution	CA 100%
Text book/s*	• Data Engineering with AWS – Second Edition Author: Gareth EagarPower BI Cookbook – Brett Powell		• Ultimate AWS Data Engineering Authors: Rathish Mohan, Shekhar Agrawal, Srinivasa Sunil Chippada
Other References	Data Engineering with AWS Cookbook Authors: Trâm Ngọc Phạm, Gonzalo Herreros González, Viqar Khan, Huda Nofal		