Department: *Information Science and Engineering*	***Course Type:*** *Core Elective*
Course Title*: DevOps*	***Course Code: 21ISE549***
L-T-P:3*-0-0*	***Credits:*** *03*
Total Contact Hours:39 *hrs*	***Duration of SEE:*** *3 hrs*
SEE Marks*: 50*	***CIE Marks:*** *50*

Pre-requisites:

Concepts of Computer Networks, Operating System, Network Security, Cloud Computing

Course Outcomes:
Students will be able to:

Cos	Course Outcome Description	Blooms Level
1	Understand the different application managed service options in the cloud.	L2
2	Apply practical skills of VPC Networks, Load Balancers to build and secure networks in Cloud Environment.	L2
3	Discover practical skills of Cloud to improve the speed, stability, availability and security for software delivery capability	L4
4	Apply practical skills needed for integrating container orchestration into their own workflow	L3
5	Discover a variety of managed big data services in the cloud.	L4

Teaching Methodology:

- Black Board Teaching
- Power Point Presentation

Assessment Methods:

- Project/ Programming assignment will be considered for 20 marks
- Three internals, 30 Marks each will be conducted, and the Average will be considered
- Final examination of 100 Marks.

Course Outcome to Programme Outcome Mapping:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3								2	2		2		3
CO2	3	2	3	3	2				2	2		2		3
CO3	3	2	3	3	2				2	2		2		3
CO4	3	2	3	3	2				2	2		2		3
CO5	3	2	3	3	2				2	2		2		3
21ISE549	3	2	3	3	2				2	2		2		3

COURSE CONTENTS

UNIT – I: Cloud automation and Management Tools	**10 hours**
Introduction to Infrastructure as Code, Cloud Deployment Manager, Public and private IP address basics, Monitoring and managing your services, applications, and infrastructure, Stackdriver, Introduction to big data managed services in the cloud, leverage big data operations with Cloud Dataproc, Build Extract, Transform, and Load pipelines using Cloud Dataflow, BigQuery, Google's Enterprise Data Warehouse.	

UNIT – II: Build and Secure Networks	**07 hours**
Securing VM's using BeyondCorp Enterprise (BCE), Multiple VPC Networks, VPC Networks – Controlling Access, Http Load Balancer, Create an internal Load Balancer.	
UNIT – III: Kubernetes in Cloud	**07 hours**
Introduction to Docker, Kubernetes Engine: Qwikstart, Orchestrating the cloud with Kubernetes, Managing Deployments using Kubernetes Engine, Continuous delivery with Jenkins in Kubernetes Engine	
UNIT – IV: DevOps Essentials	**07 hours**
Accelerate the state of DevOps, Cloud source Repositories: Start, Managing Deployments using Kubernetes Engine, Deploy Kubernetes Load Balancer Service with Terraform, Google Kubernetes Engine Pipeline using Cloud Build, Continuous Delivery with Google Cloud Deploy.	
UNIT – V: ML in Cloud	**08 hours**
Introduction to machine learning in the cloud, Vertex AI, Cloud Natural Language API, Cloud Speech API, Video Intelligence, Reinforcement Learning.	

Textbooks:

Google Cloud Teaching Resources

Reference books:

- Practical DevOps – Joakim Verona, PACKT Publisher
- DevOps for Developers – Michael Huttermann, APress