

**CENTRAL UNIVERSITY OF KERALA
DEPARTMENT OF COMPUTER SCIENCE
M.Sc. COMPUTER SCIENCE**

ELECTIVE COURSE					
COURSE CODE	COURSE TITLE	CONTACT HRS/WEEK			CREDITS
		LEC	LAB	TUT	
CSC5004	Cloud Computing	2	2	1	4

Lec = Lecture, Tut = Tutorial, Lab = Practical

This is a participatory and experimental **skill development course**.

Course Objective:

The objective of the course is to provide theoretical and practical aspects of cloud computing.

By completing this course, students will obtain the following course/learning outcomes:

1. Knowledge gained:
 - (i) State of art methods, challenges, architecture and applications of cloud computing.
2. Skill gained:
 - (ii) Skills in modelling and development of cloud based service using cloud technology.
3. Competency gained:
 - (iii) Implementation/virtualization of cloud based service for various applications.

Prerequisites: Basic knowledge of understanding web technology

Grading:

Lab implementation	– 10%
Participatory based group Project	– 10%
Assignment/Quiz/presentation	– 10%
Class Test	– 10%
Final Exam	– 60%

CSC5004 – Cloud Computing

Module 1

Introduction to Cloud Computing– Definition, Characteristics, Cloud architecture - Layers – Deployment models - Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, Benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS, Cloud computing platforms: Infrastructure as service; Amazon EC2, Platform as Service; Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.

Module 2

Introduction to Cloud Technologies- Study of Hypervisors. Compare SOAP and REST, Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization, Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenance using cloud data stores, Data access control for enterprise applications, Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development.

Module 3

Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud, Cloud computing security architecture: Cloud computing security challenges: Virtualization security management- virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.

Module 4

Issues in cloud computing, implementing real time application over cloud platform, Issues in Intercloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS), monitoring in a cloud computing environment. Cloud Middleware. Mobile Cloud Computing. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration.

References

1. Frederic Magoules, *Fundamentals of Grid Computing: Theory, Algorithms and Technologies*, Chapman and Hall, 2010
2. B. Wilkinson, *GRID Computing, Techniques and Applications*, Chapman, 2009
3. Antonopoulos, Nick; Gillam, Lee, *Cloud Computing Principles, Systems and Applications*, Springer, 2010.
4. G. Reese, *Cloud Application Architecture*, O'Reilly, 2009