

Course Code	Course Name	Teaching Scheme (hrs/week)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical/Oral	Tutorial	Total
BEITC702	Cloud Computing	04	02	---	04	01	---	05

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of 2 Tests					
BEIT C702	Cloud Computing	20	20	20	80	25	---	25	150

Course Objectives:

This course will help the students to get familiar with cloud computing fundamentals, architecture, services, implementation and deployment techniques etc.

Course Outcomes:

After completion of the course the learner should be able to:

1. Differentiate different computing techniques.
2. Compare various cloud computing providers/ Software.
3. Handle Open Source Cloud Implementation and Administration.
4. Understand risks involved in cloud computing.

DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours
1.	Introduction to Cloud Computing	<ul style="list-style-type: none"> - Introduction – Component of CC – Comparing CC with Virtualization, Grids, Utility Computing, client-server model, P-to-P Computing – Impact of CC on Business – Key Drivers for Cloud Computing - Cloud computing Service delivery model - Cloud Types – Private, Public and Hybrid, when to avoid public cloud, Cloud API 	2
2.	Virtualization	<ul style="list-style-type: none"> - Introduction & benefit of Virtualization – Implementation Levels of Virtualization- VMM Design Requirements and Providers – Virtualization at OS level – Middleware support for Virtualization – Virtualization structure/tools and mechanisms: Hypervisor and Xen Architecture, Binary Translation with full Virtualization, Para Virtualization with Compiler Support – - Virtualization for CPU, Memory and I/O Devices, Hardware support for Virtualization in intel x86 processor – CPU Virtualization – Memory Virtualization and I/O Virtualization – Virtualization in Multicore processors 	4
3.	Cloud computing Services	XaaS, IaaS, PaaS- Leveraging PaaS for Productivity- Languages for PaaS- DBaaS(Database as a services) – SaaS (Software as a service) – Comparison of various cloud computing providers/ Softwares.	4
4.	Cloud Computing and Business Value	Key Business Drivers for CC- Cloud computing and out sourcing – Types of Scalability – Security issues in Cloud Computing- time to Market Benefits- Distribution over Internet – Three levels of Business value from Cloud computing.	4
5.	Open Source Cloud Implementation and Administration	Eucalyptus and Open Stack Architecture Features – Components – Various mode of operations – Installation and configuration process of both open source – Cloud Administration and Management Task – Creating User Interface (Web Interface) of Private cloud.	6

6.	Cloud Deployment Techniques	Factors for Successful Cloud Deployment – Network Requirements – Potential Problem areas in a cloud Network and their Mitigation – Cloud Network Topologies – Automation and Self-service feature in a cloud –cloud performance.	4
7.	Security	Security for Virtualization Platform – Host security for SaaS, PaaS and IaaS – Data Security – Data Security Concerns – Data Confidentiality and Encryption – Data Availability – Data Integrity – Cloud Storage Gateways – Cloud Firewall	4
8.	Architecture for Cloud Application	Cloud Application requirements- Architecture for traditional Vs Cloud Applications- Multi-ties Application Architecture- SOA for Cloud applications – Resource oriented SOA – Method –oriented SOA and Event Driven SOA – Parallelization within Cloud Applications – Leveraging In-memory Operations for Cloud Application	4
9	Cloud Programming	Programming Support for Google Apps engine: GFS, Big Tables, Googles NO SQL System, Chubby, Google Distibuted Lock Service, Programming Support for Amazon EC2: Amazon S3, EBS and Simple DB etc.	4
10	Adoption and Use of Cloud	Adoption of Public cloud by SMBs- Public Cloud Adoption phase for SMBs- Vendor liability and Management Adoption process of Public clouds by Enterprises – Managed Private clouds Migrating Application to the cloud – Impact of Shared Resources and Multi-Tenancy on cloud Applications – Phases during Migration an Application to An IaaS Cloud	4
11	Risks of Cloud Computing and Related Costs	Risk Assessment and Management – Rosk of Vendor Lock-in – Risk of Loss of control over IT services- Risk of Poor Provisioning – Risk of Multi-tenant environment – Risk failure of cloud provider – SLA risk –security, malware and Internet Attacks – Risk with Application Licensing.	2
12	AAA Administration for Clouds	AAA model – SSO for Clouds – Authentication management and Authorization management in clouds – Accounting for Resource utilization.	2

13	Security as a service	What can security as service offer- Benefits for Security as a service – Issues with Security as a Service- Identity Management as a Service	2
14	Mobile Cloud Computing	Introduction, Defination, Architecture, Benefits, challenges in mobile and at cloud shield	2

Text Books:

1. Cloud Computing Principles and Paradigms, Rajkumar Buyya Wiley
2. Distributed and Cloud Computing, Kai Hwang, Mk Publication
3. Cloud computing Black Book Dreamtech Publication

References:

1. Using Google Apps engine O'reilly Publication
2. Programming Amazon EC2, O'reilly Publication
3. Cloud security, Ronald L. Wiley Publication
4. Cloud computing Dr. Kumar Saurabh, wily Publication
5. Virtualization for Dummies, Wiley Publication

Term work:

Suggested Practical List (If Any):

1. Implementation of Private cloud using Eucalyptus or Open stake
 - Working with KVM to create VM
 - Installation and configuration of Private cloud
 - Bundling and uploading images on a cloud
 - Creating web based UI to launch VM
 - Working with Volumes – Attached to the VM
2. Programming using Google Apps engine and Pythone

Theory Examination:

- Question paper will comprise of 6 questions, each carrying 20 marks.
- Total 4 questions need to be solved.
- Q.1 will be compulsory, based on entire syllabus.
- Remaining question will be randomly selected from all the modules.

Weightage of marks should be proportional to number of hours assigned to each module.