FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

Father Agnel Ashram, Bandstand, Bandra-West, Mumbai-50.

Department of Information Technology

T.E. (I.T.) (Semester VI) (2019-2020)

Lecture Plan

Subject: Cloud Computing and Services Credits: 04

Syllabus:

Course Code	Course Name	Credits
ITC603	**Cloud Computing and Services**	**04**

Module	Detailed Contents	Hrs
01	Defining Cloud Computing, Cloud and othersimilar configurations, Components of CloudComputing, Cloud types: NIST and Cloud Cube Models, Cloud Deployment Models and ServiceModels, Cloud computing architecture,Advantages and Disadvantages of CloudComputing.	**06**
02	Virtualization: Characteristics of virtualized environment, Understanding the importance of Hypervisors, Type I & Type II Hypervisors, Taxonomy of virtualization, Implementation Levels of Virtualization, Virtualization of CPU, Memory and I/O Devices , Virtualization and Cloud Computing, Pros and Cons of virtualization, Technology Examples: KVM, Xen, Vmware and HyperV	**10**
03	Exploring Cloud Computing Services: SPI Model: Software as a service, Platform as a service, and Infrastructure as a service. Anything as a service or Everything as a service (XaaS): Security as a Service, Identity management as a Service, Database as a Service, Storage as a Service, Collaboration as a Service, Compliance as a Service, Monitoring as a Service, Communication as a Service, Network as a Service, Disaster recovery as a service, Analytics as a Service, Backup as a Service.	**09**
04	Open Stack Cloud Architecture: Feature of Open stack, Components of Open stack, mode of operations. Programming support for Google apps engineGFS, Bigtables, Chubby, Google APIs. Mobile Cloud Computing: Definition, architecture, benefits and challenges of mobilecloud computing.	**09**
05	AWS cloud computing Platform, a) Elastic Compute Cloud(EC2): Compute Basics, Instance types, Life cycle of instances. b) Simple Storage Service (S3): Basics and Operations, Features, Amazon Glacier, Glacier vs S3. c) Elastic Block Storage (EBS):Basics and Types of EBS Volumes d)Amazon Virtual Private Cloud (Amazon VPC): Subnets, Route tables, Elastic IP Addresses (EIP), Elastic Network Interfaces (ENIs) & Security groups & ACL. e) Exploring Elastic Load Balancing (ELB): Basics, Types of load balancers, Configuring Elastic Load Balancing, Basics of Cloud Watch & Auto Scaling	**11**
06	Cloud Backup Solutions and their features, Cloud data management interface (CDMI), Cloud Storage gateways (CSG), Comparison between different cloud platforms: Amazon web services & Open stack (Based on Type of deployment, Services supported and their components).	**05**

Text Books:

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1. Barrie Sosinsky ,"Cloud Computing Bible",Wiley Publication.
2. Kailash Jayaswal, Jagannath Kallalurchi, Donald J. Houde, Dr. Deven Shah, "Cloud Computing Black Book", Dreamtech Press.
3. Joe Baron et.al ,"AWS certified solution Architect", Sybex publication.
4. Mastering Cloud Computing, Rajkumar Buyya, MGH publication

Reference Books:

1. Thomas Erl,Robert Cope,Amin naserpour,"Cloud Computing Design Patterns",Pearson Publication.
2. Judith Hurwitz ,"Cloud Computing for Dummies" , Wiley Publication.

Assessment:

Internal Assessment for 20 marks:

Consisting of **Two Compulsory Class Tests**

Approximately 40% to 50% of syllabus content must be covered in First test and remaining 40% to 50% of syllabus contents must be covered in second test.

End Semester Examination: Some guidelines for setting the question papers are as:

- Weightage of each module in end semester examination is expected to be/will be proportional to number of respective lecture hours mentioned in the syllabus.
- Question paper will comprise of total **six questions**, **each carrying 20 marks.**
- **Q.1** will be **compulsory** and should **cover maximum contents of the syllabus**.
- **Remaining question will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any other module. (Randomly selected from all the modules.)
- Total **four questions** need to be solved.

Outcomes: Course Outcome Statement

At the end of the course students will be able to:

Sr.No.	Course Outcome Statement
1	Define Cloud Computing and memorize the different Cloud service and deployment models
2	Describe importance of virtualization along with their technologies.
3	Use and Examine different cloud computing services
4	Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing
5	Describe the key components of Amazon web Service
6	Design & develop backup strategies for cloud data based on features.

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CO Assessment Tools

	Direct Methods					**Indirect Methods**
	Test 1	**Assignment 1**	**Test 2**	**Assignment 2**	**University Theory Exam**	Course Exit Survey
CO1	50%	30%	-	-	20%	100%
CO2	50%	30%	-	-	20%	100%
CO3	50%	30%	-	-	20%	100%
CO4	-	-	50%	30%	20%	100%
CO5	-	-	50%	30%	20%	100%
CO6	-	-	50%	30%	20%	100%

1.3 CO-PO and CO-PSO Mapping

Course Name	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2				3								2	2
CO2	2		3		3								2	1
CO3	1	1	2	3	2								1	1
CO4	1	1		2	2								1	1
CO5	2		1	3									1	2
CO6	1		1	2	1								1	1

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Lecture Plan:

No of classes Planned:	**43**	**No of Classes taken:**	**43**	
Sr. No.	**Topic Planned**	**Planned Date**	**Actual Date**	**Delivery Mechanisms**
1.	Pre requisite: OSI model, Basic Concept of OS, Basics of Middleware and Web technologies.	06/01/20		Board + PPT
2.	Various definitions of Cloud computing, Basics of Cloud computing, characteristics of Cloud Computing.	07/01/20		Board + PPT
3.	Cloud and similar configurations, Cloud computing NIST model, Cloud computing Cube model.	08/01/20		Board + PPT
4.	Cloud computing architecture.	09/01/20		Board + PPT
5.	Cloud Deployment models, Cloud computing Service Models, Understanding IaaS, Understanding PaaS	13/01/20		Board + PPT
6.	Understanding SaaS, Business Process as a Service(BPaaS), Exercise to understand roles and responsibilities in cloud	14/01/20		Board + PPT
7.	Advantages and disadvantages of Cloud computing, Limitations of Cloud computing, Challenges in cloud Computing, Comparison of cloud service models	15/01/20		Board + PPT
8.	Basics of Virtualization, Early days of VM, Virtualization reference model, Characteristics of Virtualization.	16/01/20		Board + PPT
9.	Taxonomy of Virtualization, Execution Virtualization, Machine reference model, Hypervisor reference architecture.	20/01/20		Board + PPT
10.	security rings of virtualization, Hardware level virtualization, Understanding Hypervisors/VMM, Type-I and Type-II Hypervisors, Examples,	21/01/20		Board + PPT

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11.	Traditional VS virtualized environment, Implementation levels of Virtualization, Hardware Virtualization techniques.	22/01/20		Board + PPT
12.	Full Virtualization, Challenges in full Virtualization(X86 architecture), Full virtualization using binary translation.	23/01/20		Board + PPT
13.	Para-Virtualization, Hardware assisted full virtualization, Advantages and disadvantages of Full Virtualization	27/01/20		Board + PPT
14.	Comparison of Emulation, Para virtualization and Full virtualization, Memory Virtualization, Operation system Level Virtualization.	28/01/20		Board + PPT
15.	CPU Virtualization, Application Virtualization, Device and I/O Virtualization	29/01/20		Board + PPT
16.	Other Examples of Virtualization, Virtualization and cloud computing, Xen hypervisor architecture.	30/01/20		Board + PPT
17.	KVM Architecture, VMware Architecture, Microsoft Hyper-V	03/02/20		Board + PPT
18.	Load Balancing and Virtualization, Advanced load Balancing, Machine Imaging, Porting Applications.	04/02/20		Board + PPT
19.	Cloud Computing SPI model, Infrastructure as a Service(IaaS), Understanding IaaS workloads, Failover handling in IaaS	05/02/20		Board + PPT
20.	Platform as a Service(PaaS), Comparison of traditional environment Vs PaaS, Categories of PaaS.	06/02/20		Board + PPT
21.	Leveraging PaaS for productivity, Guidelines for selecting PaaS Provider, Concerns With PaaS, Services, Characteristics of a good PaaS system.	10/02/20		Board + PPT
22.	integrated lifecycle platform, PaaS Application Frameworks, Software as a Service(SaaS) Overview, Advantages of SaaS, Application service Provider(ASP) VS SaaS,	11/02/20		Board + PPT
23.	Limitations of SaaS, SaaS: Driving forces, Anything as a Service(XaaS), Examples of XaaS.	12/02/20		Board + PPT
24.	Security as a service (SECaaS), SECaaS models, Benefits and Challenges of SECaaS	13/02/20		Board + PPT

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25.	Identity management as a Service, components IDaaS,	02/03/20		Board + PPT
26.	Database as a Service, Examples of DBaaS, Storage as a Service. Case of one drive and Google Drive.	03/03/20		Board + PPT
27.	Collaboration as a Service, Compliance as a Service	04/03/20		Board + PPT
28.	Monitoring as a Service, Communication as a Service	05/03/20		Board + PPT
29.	Network as a Service, Disaster recovery as a service,	09/03/20		Board + PPT
30.	Analytics as a Service, Backup as a Service.	11/03/20		Board + PPT
31.	Open Stack Cloud Architecture: Feature of Open stack, Components of Open stack	12/03/20		Board + PPT
32.	components of Open Stack, mode of operations in Open stack.	16/03/20		Board + PPT
33.	Google AppEngine, Programming support for Google apps engine-GFS	17/03/20		Board + PPT
34.	Bigtables, Chubby, Google APIs.	18/03/20		Board + PPT
35.	Mobile Cloud Computing: Definition and architecture.	19/03/20		Board + PPT
36.	Benefits and challenges of Mobile cloud computing, cloudlets	23/03/20		Board + PPT
37.	Overview of Amazon Web Services, Major products and plans of AWS, Instantiating Amazon Machine Images	24/03/20		Board + PPT
38.	Provisioning storage, databases, and other services, Simple Storage Service (S3): Basics and Operations, Features, Amazon Glacier, Glacier vs S3.	26/03/20		Board + PPT
39.	Elastic Block Storage (EBS):Basics and Types of EBS Volumes	27/03/20		Board + PPT

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40.	Amazon Virtual Private Cloud (Amazon VPC): Subnets, Route tables, Elastic IP Addresses (EIP), Elastic Network Interfaces (ENIs) & Security groups & ACL.	30/03/20		Board + PPT
41.	Exploring Elastic Load Balancing (ELB): Basics, Types of load balancers, Configuring, Elastic Load Balancing, Basics of Cloud Watch & Auto Scaling.	31/03/20		Board + PPT
42.	Cloud Backup Solutions and their features, Cloud data management interface (CDMI),	01/04/20		Board + PPT
43.	Storage gateways (CSG), Comparison between different cloud platforms: Amazon web services & Open stack (Based on Type of deployment, Services supported and their components).	07/04/20		Board + PPT