CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	**Experts from Higher Technical Institutions**	**Internal Experts**
Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mrs.E.Aarthi
		2.Dr.P.Muthulakshmi

Course Code	UCS20D08J	Course Name	CLOUD COMPUTING	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	**Nil**
Course Offering Department	Computer Science	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning		
		1	2	3
CLR-1 :	understand the evolution of parallel and distributed computing	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLR-2 :	understand the architecture of cloud			
CLR-3 :	understand the need for virtualization			
CLR-4 :	the concepts behind scheduling and load balancing that is happening across heterogeneous resources in the environment			
CLR-5 :	justify the need for improved hardware and software infrastructures (servers, protocols, security algorithms)			
CLR-6 :	know the commercial functioning of cloud computing			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:			
CLO-1 :	defend the need for cloud computing to run an online business	3	80	70

Program Learning Outcomes (PLO)														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

CLO-2 :	understand and figure out the necessities of middleware technologies	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	practically create a virtual environment (lab purpose using VMware)	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	implement cryto algorithms that may be used in the computing environment	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	use few libraries from the cloud sim to create Cloudlets, CloudletList, scheduling modules	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Implement the methods for real time cloud environment	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Evolution and History of cloud computing	Cloud Infrastructure	Platform as a Service	Data in Cloud	Cloud Computing – Simulation
	SLO-2	Introduction to Cloud Computing	Architectural Design of computer and storage Clouds	Evolution of PaaS	Data as a Service	Cloud Computing : Simulation Tools
S-2	SLO-1	Cloud Types	Layered Cloud Architectural Development	Introduction to Paas	DaaS : Architecture	Simulation Tools : CloudSim,CloudAnalyst
	SLO-2	Basics types of Models	Cloud enabling technologies	Paas Service Provider	DaaS : Advantages	Simulation Tools :Green Cloud,EMUSIM
S-3	SLO-1	Layers and types of Cloud	Data center technologies	Platform as a Service: Acquia Cloud	DaaS :Disadvantage	Simulation Tools :GroundSim, MR-CloudSim
	SLO-2	Features of Cloud Computing	Web technologies	Platform as a Service: Amazon AWS	Database as a service	Cloud based Web Applications & Service Testing Tools
S-4	SLO-1	Cloud Computing Stack	Multitenant technologies	Platform as a Service : APP42PaaS	Cloud Based data storage	Cloud based Web Applications & Service Testing Tools
	SLO-2	Advantages of Cloud computing	Service technologies	Platform as a Service: Google App Engine	Advantage and limitations	Cloud Based Mobile & Multimedia Application Testing Tools
S 5-8	SLO-1 SLO-2	Laboratory 1: Create a virtual machine	Laboratory 4:Create a drop box using Google AP	Laboratory 7:Encryption and Decryption of Text	Laboratory 10: Laboratory 8: Simple Experiments in CloudSim	Laboratory 13: Create a Warehouse Application in Sales force.Com
S-9	SLO-1	Components of Cloud computing	Hardware and Infrastructure	PaaS Application Framework	Cloud Storage Interoperability	Cloud Applications and New Opportunity
	SLO-2	Limitations of Cloud computing	Client network	PaaS Operator Verbs	Cloud Security	Design approach with case studies
S-10	SLO-1	Cloud Computing service providers	Security Networks	Paas Developer Verbs	Introduction	Design methodology for IaaS service model
	SLO-2	Types of service provider	Services	Advantages and challenges of PaaS	Security Risks and Best Practice	Google API
S-11	SLO-1	Virtualization	Accessing the cloud	Software as a Services	Security Cloud	AWS EC2 instance

	SLO-2	History of virtualization	Platforms	Evolution of SaaS	Security risk and Best Practices	Migration
S-12	SLO-1	Introduction to virtualization	Web Applications	Basis of SaaS	Security Cloud : CIA Concept	Specific Cloud Services Models
	SLO-2	Types of Virtual Machines	Web APIs	Advantages of SaaS	Types of Security Attacks	Introduction
S 13-16	SLO-1	Laboratory 2: Installation of Platforms	Laboratory 5: Transfer Data using Google APPs	Laboratory 8: Simple Experiments in Cloud Sim	Laboratory 11: Laboratory 8: Simple Experiments in Cloud Sim	Laboratory 14: Create a Warehouse Application in Sales force.Com using Apex prog Lang
	SLO-2					
S-17	SLO-1	Advantages of virtualization	Web browsers	Brief Introductory part of software as a service	Security Policy Implementation	Resource allocation in cloud computing
	SLO-2	Components of virtualization	Cloud storage	Saas : Unification Technologies	Security Policy Implementation : Policy Types	Introduction
S-18	SLO-1	Virtualization system	Overview	Saas :Integrated Products	Techniques to Secure Data	Importance of Cloud Computing
	SLO-2	Types of virtualizations	Cloud Storage Provider	Saas product selection criteria	Cloud Encryption	Strategies for Resource Allocation
S-19	SLO-1	From virtual computing to clouds	Standards	Saas Integration services	Symmetric Encryption	Resource Allocation Policies and Algorithms
	SLO-2	Key points on cloud	Applications	Infrastructure as a Service	Cloud Security Alliance	Performance-based RAS
S-20	SLO-1	Load balancing and virtualization	Client services	IaaS Architecture	Cloud Security Strategy	Cost Based RAS
	SLO-2	Virtualization security Management	Infrastructure services	IaaS Provider	Cloud Computing Security Architecture	Performance and cost based RAS
S 21-24	SLO-1	Laboratory 3: Deploying existing Apps	Laboratory 6: upload and download using Google APPs	Laboratory 9: Simple Experiments in CloudSim	Laboratory 12:Simple Experiments in CloudSim	Laboratory 15:Implimentation of SOAP Web Services
	SLO-2					

Learning Resources	1. Dr.AnandNayyar, (2019), "Handbook of Cloud Computing", BPB

Learning Assessment											
Bloom's Level of Thinking		Continous Learning Assessment(50% Weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4# (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%

	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100%	

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Mr. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1. Dr.S.P. Angelin Claret 2 .Mr.M.D.Bakthavachalam

Course Code	UCS20D09J	Course Name	INTERNET OF THINGS	Course Category	E	Discipline Special Elective	L	T	P	C
							4	0	4	6

Pre-requisiteCourses	Nil	Co-requisiteCourses	Nil	ProgressiveCourses	Nil
Course Offering Department	Computer Science	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning		
		1	2	3
CLR-1 :	Demonstrate the design, communication model and enabling technologies for IoT.	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLR-2 :	Explore the system management and domain for various applications of IoT			
CLR-3 :	Categorize the various protocols that are used for developing IoT applications.			
CLR-4 :	Deploy an IoT application and connect to the cloud.			
CLR-5 :	Develop IoT application for real time scenario			
CLR-6 :	Implemetation of IoT application for real world problems			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLO-1 :	Apply the knowledge/understanding of mathematics, science, to the solution of complex problems applicable to the discipline	3	80	70

Program Learning Outcomes (PLO)														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
L	H	-	H	L	-	-	-	L	L	-	H	-	-	-