Course Code	18AIE429T	Course Name	Cloud Computing	Course Category	E	Professional Elective	L	T	P	C
							3	0	0	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Artificial Intelligence	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:		Learning		Program Learning Outcomes (PLO)

		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)		1 Engineering	2 Problem Analysis	3 Design &	4 Analysis, Design,	5 Modern Tool Usage	6 Society & Culture	7 Environment &	8 Ethics	9 Individual & Team	10 Communication	11 Project Mgt. &	12 Life Long Learning	13 PSO - 1	14 PSO - 2	15 PSO – 3
CLR-1 :	Understand the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges	1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	*Gain knowledge on virtualization structure and its tools*																			
CLR-3 :	Explore the different cloud architectures																			
CLR-4 :	Design the cloud security threats and protective mechanism for cloud computing																			
CLR-5 :	*Implement the applications on cloud development*																			
Course Learning Outcomes (CLO):	*At the end of this course, learners will be able to:*																			
CLO-1 :	*Acquire the knowledge about fundamentals of cloud computing*	*3*	*85*	*80*		*H*	*H*	*H*	*H*	*L*	-	-	-	-	-	-	*H*	*H*	*M*	*M*
CLO-2 :	*Analyze the structure of virtualization*	*3*	*85*	*80*		*H*	*H*	*H*	*H*	*H*	*L*	*L*	*L*	*M*	-	-	*H*	*H*	*H*	*H*
CLO-3 :	Design the knowledge on different cloud architectures	*3*	*85*	*80*		*H*	*H*	*H*	*H*	*H*	*L*	-	*L*	*M*	-	-	*H*	*H*	*H*	*H*
CLO-4 :	Evaluate the security issues related to cloud computing and handle the security threats and construct different cloud delivery design models	*3*	*85*	*80*		*H*	*H*	*H*	*H*	*H*	*L*	-	-	*M*	-	-	*H*	*H*	*H*	*H*
CLO-5 :	*Implement the knowledge on applications of cloud development*	*3*	*85*	*80*		*H*	*H*	*H*	*H*	*H*	*L*	-	*L*	*M*	-	-	*H*	*H*	*H*	*H*

Duration (hour)		*9*	*9*	*9*	*9*	*9*
S-1	***SLO-1***	*Cloud Computing Fundamentals: Evolution of Cloud Computing*	*Introduction & benefit of Virtualization: Implementation Levels of Virtualization*	***Service Models:** Infrastructure as a Service (IaaS)*	*Fundamental Cloud Security: Basic Terms and Concepts, Threat Agents, Cloud Security Threats*	*Cloud Application Development and Architectural Styles*
	SLO-2	*Cloud Computing definition*				
S-2	***SLO-1***	*Origin of Cloud Computing, Basic Concepts and Terminology*	*VMM Design Requirements and Providers*	*Resource Virtualization: Server, Storage, Network*	*Cloud Security Mechanisms: Encryption, Hashing: Digital Signature, Public Key Infrastructure*	*MapReduce Programming Model*
	SLO-2					
S-3	***SLO-1***	*Goals and Benefits, Risks and Challenges, Roles and Boundaries, Cloud Characteristics*	*Virtualization at OS level*	*Case studies: Platform as a Service (PaaS)*	*Identity and Access Management*	*Case Study: the Grep, The Web Application*
	SLO-2		*middleware support for Virtualization*			
S 4	***SLO-1***	*Types of cloud, Cloud services*	*Virtualization structure/tools and mechanisms: Hypervisor and Xen Architecture, Binary Translation with*	*Cloud platform & Management: Computation, Storage*	*Single Sign-On: Kerberos authentication, One-time password*	*Hadoop: SLO-2 Yarn and Tez*
	SLO-2					

			full Virtualization, Para Virtualization with Compiler Support			
S-5	***SLO-1***	*Cloud Delivery Models, Cloud Deployment Models*	*Virtualization fo CPU, Memory and I/O Devices*	*Case studies. Software as a Service (SaaS)*	*Basic cloud data security mechanisms*	*SQL on Hadoop: Pig, Hive, and Impala*
	SLO-2					
S-6	***SLO-1***	*Cloud Service Providers and the Cloud Ecosystem*	*Hardware support for Virtualization in intel x86 processor*	*Web services, Web 2.0,*	*Advanced Clouds, Mobile Cloud*	*Current Cloud Applications and New Opportunities*
	SLO-2					
S-7	***SLO-1***	*Amazon Web Services(AWS), Google Clouds, Microsoft Azure Cloud*	*CPU Virtualization*	*Web OS*	*Media Cloud, Green Cloud*	*Design approaches with Case Study*
	SLO-2					
S-8	***SLO-1***	*SLA Management in Cloud Computing: A Service Providers Perspective*	*Memory Virtualization and I/O Virtualization*	*Case studies : Anything as a service (XaaS)*	*Virtual Machine Security, Security of Virtualization, A Trusted Hypervisor*	*Design methodology for IaaS Service SLO-2 Model*
	SLO-2					
S-9	***SLO-1***	*Case Study on Open Source & Commercial Clouds: Eucalyptus, OpenStack, Aneka*	*Virtualization in Multicore processors*	*Microservices*	*Mobile Devices and Cloud Security*	*Google API, AWS EC2 Instances*
	SLO-2					

Learning Resources	1. Dan C. Marinescu," Cloud Computing Theory and Practice", Second Edition Copyright © 2018 Elsevier Inc. All.https://www.sciencedirect.com/book/9780128128107/cloud-computing 2. Rajkumar Buyya, James Broberg, AndrzejGoscinski, Cloud Computing Principles and Paradigms, Wiley Publications, 2017. 3. Gautam Shroff, "Enterprise Cloud Computing Technology Architecture Applications",Cambridge University Press; 1 edition,[ISBN: 978-0521137355],2010. 4. Thomas Erl, ZaighamMahmood, and RichardoPuttini, "Cloud Computing: Concepts, Technology & Architecture", Prentice Hall/PearsonPTR, Fourth Printing, 2014, ISBN: 978013338752. 5. K. Chandrasekaran, "Essentials of Cloud Computing", Chapman and Hall/CRC Press, 2014, ISBN 9781482205435 6. Arshdeep Bahga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", University Press, 2016, ISBN13: 978-0996025508.

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	*40%*	-	*15%*	-	*15%*	-	*15%*	-	*15%*	-
	Understand										
Level 2	Apply	*40%*	-	*20%*	-	*20%*	-	*20%*	-	*20%*	-
	Analyze										
Level 3	Evaluate	*20%*	-	*15%*	-	*15%*	-	*15%*	-	*15%*	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

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
Dr. Marriappan Vaithilingam, Senior Director of Engineering, Fresh works	Dr. S. Muthurajkumar, Anna University	Dr.R.Rani Krithiga,SRMIST