

	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %	100 %	100 %	100 %	100 %	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
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:		
CLR-1 :	Demonstrate the design, communication model and enabling technologies for IoT.			
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:		
CLO-1 :	Apply the knowledge/understanding of mathematics, science, to the solution of complex problems applicable to the discipline			

Learning		
1	2	3
Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
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 :	Design, implement, and evaluate a computer-based system, process, component, or program to meet desired solutions that meet the specified needs with suitable concern for the public health and safety, and the cultural, societal, and environmental considerations.	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Create, select, and apply applicable techniques, resources, and modern engineering and IT tools to complex engineering activities with an understanding of the limitations.	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Function successfully as an individual, and as a member or leader in assorted teams, and in multidisciplinary settings.	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Prove knowledge and understanding of the engineering and management principles and apply the same to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Apprehend the importance of technology with the current scenario	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (Hour)		24	24	24	24	24
S-1	SLO-1	Introduction	Introduction	Introduction about lot protocols	IoT Platforms Design Methodology	Introduction about RESTful API
	SLO-2	Definition& Characteristics of IoT	Application of IoT	Infrastructure	Purpose & Requirements, process model specification, domain model specification	Designing a RESTful Web API
S-2	SLO-1	Physical design of IoT	Home Automation	6LowPAN	Information model specifications, service specifications, lot level specifications	Amazon Web Services
	SLO-2	Things in IoT	Discuss Home automation problems	Architecture of 6LowPAN	Functional view specifications, operational view specifications.	Amazon Web Services for IoT
S-3	SLO-1	IoT protocols	Cities	Ipv6	Device & component Integration, Application development	Creating a ID in Amazon
	SLO-2	IoT protocols	Discuss cities problem	Architecture of Ipv6	IoT System for Weather Monitoring	EC2
S-4	SLO-1	Logical Design of IoT	Industry	Comms / Transport	Purpose & Requirements, process model specification, domain model specification	Implementation of EC2
	SLO-2	IoT Functional Blocks	Discuss Industry problem	Wifi	Information model specifications, service specifications, lot level specifications	Autoscaling
S-5-8	SLO-1	Laboratory 1: Define and Explain Eclipse IoT Project.	Laboratory 4: Demonstrate a smart object API gateway service reference	Laboratory 7: Explain the application framework and embedded software agents for	Laboratory 10: Give overview of Zetta.	Laboratory 13: Smart Irrigation System
	SLO-2					

			implementation in IoT toolkit	IoT toolkit.		
S-9	SLO-1	IoT Communication Model	Health & Lifestyle	Bluetooth	Functional view specifications, operational view specifications.	Implementation of Autoscaling
	SLO-2	and IoT Communication APIs	Discuss Health & Lifestyle problem	Discovery	Device & component Integration, Application development	S3
S-10	SLO-1	IoT Enabling Technologies	M2M	Physical Web	IoT System for Agriculture	Implementation of S3
	SLO-2	Wireless Sensor Networks	Architecture of M2M	mDNS	Purpose & Requirements, process model specification, domain model specification	RDS
S-11	SLO-1	Cloud Computing	SDN	DNS-SD	Information model specifications, service specifications, lot level specifications	Implementation of RDS
	SLO-2	Big Data Analytics	Architecture of SDN	Data Protocols	Functional view specifications, operational view specifications.	DynamoDB
S-12	SLO-1	Communication Protocols	NFV for IOT	MQTT	Device & component Integration, Application development	Implementation of DynamoDB
	SLO-2	Embedded Systems	Architecture of NFV	Examples of MQTT	Introduction to Cloud Storage Models	Kinesis
S 13-16	SLO-1	Laboratory 2: List and summarize few Eclipse IoT Projects.	Laboratory 5: Write and explain working of an HTTP- to-CoAP semantic mapping proxy in IoT toolkit.	Laboratory 8: Explain working of Raspberry Pi.	Laboratory 11: Home Automation – Level 0	Laboratory 14: Weather Reporting Systems
	SLO-2					
S-17	SLO-1	IoT Levels and Deployment Templates	IoT System Management	Difference between MQTT and HTTP	Introduction to Cloud StorageCommunication APIs	Implementation of Kinesis
	SLO-2	Level 0	Advantages of IoT system management	CoAP	Python Web Application Framework	Case studies - Environment
S-18	SLO-1	Level 1	Need for IoT Systems Management	Types of CoAP	Django Architecture	IoT systems for weather Reporting Bot
	SLO-2	Level 2	Disadvantages of IoT system management	Request and Response methods	Design of Weather Monitoring using Django	Air Pollution Monitoring System
S-19	SLO-1	Level 3	Simple Network Management Protocol	Pros and Cons of CoAP	Starting Development with Django Toolkit	Forest Fire Detection
	SLO-2	Level 4	Limitations of SNMP	AMQP	arduino	Case studies - IoT system for Energy
S-20	SLO-1	Level 5	Network Operator	Semantic	rasberry pi	Smart grid
	SLO-2	IOT Applications	Requirements	JSON- LD	Explanation of raspberry pi pin diagram	Renewable Energy Systems
S 21-24	SLO-1	Laboratory 3: Sketch the architecture of IoT Toolkit and explain each entity in brief	Laboratory 6: Describe gateway as a service deployment in IoT toolkit	Laboratory 9: Connect Raspberry Pi with your existing system components	Laboratory 12: Home Automation – Level 4	Laboratory 15: Air Pollution Monitoring System
	SLO-2					

Learning Resources	1.ArshdeepBahga and Vijay Madisetti, (2015), "Internet of Things - A Hands-on Approach", Universities Press 2.Dieter Uckelmann et.al, (2011), "Architecting the Internet of Things", Springer 3.CunoPfister, (2011), "Getting Started with the Internet of Things", O'Reilly, 2011.	4.Adrian McEwen, Hakim Cassimally, (2014), "Designing the Internet of Things", Wiley 5.HonboZhou, (2012), "The Internet of Things in the Cloud: A Middleware Perspective ", CRC Press 6.Olivier Hersent, David Boswarthick, Omar Elloumi, (2012), "The Internet of Things – Key applications and Protocols", Wiley
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Learning Assessment											
Bloom's Level of Thinking		Continuous 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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		2. Ms.G.S.Gayathri
		3. Mrs.Aarthi.E