Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Electronics and communication Engineering

(Academic Year 2019-20)

Subject Code:EC606A-N	**Subject Title: INTERNET OF THINGS**
Pre-requisite	

Course Objective:

The educational objectives of this course are

- To build a couple of applications that will communicate with IoT hardware and software.
- To understand the network management and Middleware services
- Be able to explain how IoT, cloud computing and big data analytics can work together
- To Understand the IoT Reference Architecture and Real World Design Constraints

Teaching Scheme (Credits and Hours)

Teaching scheme				**Total Credit**	**Evaluation Scheme**					**Total Marks**
L	**T**	**P**	**Total**		**Theory**		**IE Marks**	**CIA Marks**	**Pract. Marks**	
Hrs	**Hrs**	**Hrs**	**Hrs**		**Hrs**	**Marks**				
03	00	02	05	04	03	70	30	20	30	150

Outline Of the Course:

Sr. No	**Title of the Unit**	**Minimum Hours**
1.	Introduction to IoT	06
2.	IoT Architecture	10
3.	IoT & M2M	04
4.	IoT Protocols	10
5.	IoT Security, Challenges and Applications.	10
6.	Developing IoTs	08
		48

Total hours (Theory): 48
Total hours (Lab): 16*02=32
Total hours: 80

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Detailed Syllabus:

Unit No.	Topics	Lecture Hours	Weightage(%)
1.	**Introduction to IoT**: Definition and Characteristics of IoT, Physical Design of IoT, IoT Protocol, Logic Design of IoT, Wireless Sensor Networks, Cloud Computing, Big Data Analytics, IoT Levels and development Templates, IoT	06	08
2.	**IoT Architecture:** IoT Architecture-State of the Art – Introduction, IoT reference Model, IoT Reference Architecture Introduction, Real-World Design Constraints, Technical Design constraints, Data representation and visualization**,** Interaction and remote control.	10	18
3.	**IoT & M2M:** Machine to Machine, Difference between IoT and M2M, Software define Network	04	10
4.	**IoT Protocols:** **IoT Data link Layer & Network Layer Protocols** (PHY/MAC Layer) **Transport Layer & Session Layer Protocols:** Transport Layer (TCP,MPTCP,UDP,DCCP,SCTP,TLS,DTLS) Session Layer (HTTP, CoAP, XMPP, AMQP, MQTT) **Service layer Protocols:** Service Layer (OneM2M, ETSI M2M, OMA, BBF, MAC 802.15.4,6LOWPAN,RPL)	10	24
5.	**IoT Security, Challenges and Applications:** Overview of Activity Chain Governance, Privacy and Security Issues, Security Privacy and Trust in Iot Data Platforms for Smart Cities, First Steps Towards a Secure Platform, The IoT Security Challenge ,Industrial Automation, Smart Grid Commercial Building Automation, Smart Cities, Home management, eHealth.	10	20
6.	**Developing IoTs:** Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python	08	20
	Total	**48**	**100**

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Learning Outcome:

At the end of this course, the student would be able

- Students will be able to design small scale as well as sophisticated embedded system.
- Student will be able to implement standalone application, GUI based application as well as multithreaded programming for real life projects.
- Students will be able to design and develop industry projects.
- Students recognize the role of professional societies in developing new structural software and updating current knowledge.

TEXT BOOKS:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1 st Edition, VPT, 2014.

REFERENCE BOOKS:

1. "Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems", Ovidiu Vermesan, Peter Friess, River Publishers.
2. Bernd ScholzReiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
3. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118- 47347-4, Willy Publications 5. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1 st Edition, VPT, 2014
5. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, Apress Publications, 2013.

List of Experiments (Not limited to following. Subject teacher may modify the same)**:**

1. Introduction to Raspberry Pi Model.
2. Interfacing of Display Devices using Raspberry Pi.
3. Interfacing RFID with Raspberry Pi.
4. Interfacing of Analog Sensor with Raspberry Pi.
5. Introduction to Node MCU ESP8266.
6. Configure Access point and station using Node MCU ESP8266.
7. Controlling of home appliances using Android application.
8. Controlling Speed of DC motor using PWM.
9. IoT based Mini Project (Smart City).