



Department of Information Technology		LP: IT16701
B.E/B.Tech/M.E/M.Tech : Information Technology Regulation:2016		Rev. No: 00
PG Specialisation : NA		Date:
Sub. Code / Sub. Name : IT16701 Internet of Things.		24.06.2019
Unit : I		

Unit Syllabus:

INTRODUCTION & CONCEPTS

9

Introduction and evolution of IoT from internet, IOT Physical Devices & Endpoints - Basic building blocks and Exemplary IOT Device: Raspberry Pi, Linux on Raspberry Pi , Raspberry Pi Interfaces - Serial , SPI , I2C , Programming Raspberry Pi with Python - Controlling LED with Raspberry Pi Interfacing an LED and Switch with Raspberry Pi , Interfacing a Light Sensor (LDR) with Raspberry Pi , Other IoT Devices - Arduino with embedded C, Intel Galileo, pcDuino , BeagleBone Black , Cubieboard.

Objective:

To provide an overview of Internet of things, building blocks of IoT, IoT and also provides an introduction to Raspberry pi device ,programming Raspberry pi with python, interfacing sensors and actuators with Raspberry pi.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction and evolution of IoT from internet Definition and characteristics	3-ch 4;pg 65-68 1-ch 1;pg 19-22	PPT
2	IOT Physical Devices & Endpoints- Basic building blocks- Exemplary IOT Device: Raspberry Pi, Linux on Raspberry Pi	1-ch 7;pg 153-162	PPT
3	Raspberry Pi Interfaces - Serial , SPI , I2C	1-ch 7;pg 162-164	PPT
4	Programming Raspberry Pi with Python - Controlling LED with Raspberry Pi , Interfacing an LED and Switch with Raspberry Pi , Interfacing a Light Sensor (LDR) with Raspberry Pi ,	1-ch 7;pg 164-167	PPT
5	Other IoT Devices - Arduino with embedded C, Intel Galileo,	4-ch 9;pg 292-311	PPT
6	Other IoT Devices -pcDuino , BeagleBone Black , Cubieboard.	1-ch 7;pg 167-170	PPT
7	Physical Design of IoT- things and protocols	1-ch 1;pg 23-29	PPT
8	Logical Design of IoT- functional blocks and communication models	1-ch 1;pg 29-35	PPT
9	IoT Enabling Technologies	1-ch 1;pg 35-38	PPT
Content beyond syllabus covered (if any): IoT enabling technologies			

* Session duration: 50 minutes



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Unit : II

Unit Syllabus: IoT PROTOCOLS

9

Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT-Software Defined Networking, Network Function Virtualization, IoT Protocol Stack, IEEE 802.15.4, BACNet Protocol, Modbus, KNX, Zigbee, 6LowPAN.

Objective:

To study about IoT protocols and to describe about the differences and similarities between IoT and M2M and application of SDN and NFV in IoT.

Session No *	Topics to be covered	Ref	Teaching Aids
10	Introduction, M2M, Difference between IoT and M2M	1-ch 3;pg 65-69	PPT
11	SDN and NFV for IoT-Software Defined Networking, Network Function Virtualization	1-ch 3;pg 69-79	PPT
12	IoT Protocol Stack	1-ch 1;pg 23-29 https://www.mphasis.com/content/dam/mphasis-com/global/en/downloads/POV/Mphasis-Digital-POV---Emerging-Open-Standard-Protocol-stack-for-IoT.pdf	PPT
13	IEEE 802.15.4	https://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/	PPT
14	BACNet Protocol	http://www.bacnet.org/Bibliography/EC-9-97/EC-9-97.html	PPT
15	Modbus	https://www.schneider-electric.co.in/en/faqs/FA168406	PPT
16	KNX	http://knx.fi/doc/esitteet/KNX-Basics_en.pdf	PPT
17	Zigbee	https://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/	PPT
18	6LowPAN.	https://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/	PPT

Content beyond syllabus covered (if any):



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Unit : III

Unit Syllabus : IoT PLATFORMS DESIGN METHODOLOGY

9

IoT Design Methodology- Purpose & Requirements Specification, Process Specification ,Domain Model Specification, Information Model Specification, Service Specifications , IoT Level specification, Functional View Specification , Operational View Specification , Device & Component Integration , Application Development , Case Study on IoT System for Weather Monitoring.

Objective:

To describe a generic design methodology for Internet of Things.

Session No *	Topics to be covered	Ref	Teaching Aids
19	IoT PLATFORMS DESIGN METHODOLOGY Introduction	1-ch 5;pg 99-100	PPT
20	Purpose & Requirements Specification, Process Specification	1-ch 5;pg 100-102	PPT
21	Domain Model Specification, Information Model Specification	1-ch 5;pg 102-103	PPT
22	Service Specifications, IoT Level specification	1-ch 5;pg 103-106	PPT
23	Functional View Specification	1-ch 5;pg 106-109	PPT
24	Operational View Specification	1-ch 5;pg 109-111	PPT
25	Device & Component Integration, Application Development.	1-ch 5;pg 111	PPT
26	Case Study on IoT System for Weather Monitoring	1-ch 5;pg 111-115	PPT
27	Case Study on IoT System for Smart Irrigation	1-ch 9;pg 275-278	PPT

Content beyond syllabus covered (if any):

Case Study on IoT System for Smart Irrigation.



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Unit : IV

Unit Syllabus : IoT PHYSICAL SERVERS & CLOUD OFFERINGS

9

Introduction to Cloud Storage Models & Communication APIs, WAMP - AutoBahn for IoT , Xively Cloud for IoT, Python Web Application Framework – Django - Django Architecture , Starting Development with Django , Designing a RESTful Web API , Amazon Web Services for IoT - Amazon EC2 , Amazon AutoScaling , Amazon S3 , Amazon RDS , Amazon DynamoDB , Amazon Kinesis, Amazon SQS , Amazon EMR , SkyNet IoT Messaging Platform.

Objective:

To provide an introduction to the use of cloud platforms and frameworks for developing IoT applications.

Session No *	Topics to be covered	Ref	Teaching Aids
28	Introduction to Cloud Storage Models & Communication APIs	1-ch 8;pg 171-172	PPT
29	WAMP - AutoBahn for IoT	1-ch 8;pg 172-176	PPT
30	Xively Cloud for IoT	1-ch 8;pg 176-179	PPT
31	Python Web Application Framework – Django - Django Architecture , Starting Development with Django	1-ch 8;pg 179-189	PPT
32	Designing a RESTful Web API	1-ch 8;pg 188-193	PPT
33	Amazon Web Services for IoT - Amazon EC2 , Amazon AutoScaling	1-ch 8;pg 193-199	PPT
34	Amazon S3 , Amazon RDS , Amazon DynamoDB	1-ch 8;pg 199-204	PPT
35	Amazon Kinesis, Amazon SQS , Amazon EMR	1-ch 8;pg 204-211	PPT
36	SkyNet IoT Messaging Platform.	1-ch 8;pg 211-216	PPT

Content beyond syllabus covered (if any):



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Unit : V

Unit Syllabus : IoT TOOLS

9

Introduction, Chef - Setting up Chef , Chef Case Studies - Multi-tier Application Deployment , Hadoop Cluster , Storm Cluster , Puppet , Puppet Case Study - Multi-tier Deployment , NETCONF-YANG Case Studies - Steps for IoT device Management with NETCONF-YANG , Managing Smart Irrigation IoT System with NETCONF-YANG, Managing Home Intrusion Detection IoT System with NETCONF-YANG.

Objective:

To study about the working of various IoT tools and IoT code generator with real time applications.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Introduction, Chef - Setting up Chef	1-ch 11;pg 352-355	PPT
38	Chef Case Studies -Multi-tier Application Deployment	1-ch 11;pg 355-360	PPT
39	Hadoop Cluster	1-ch 11;pg 360-368	PPT
40	Storm Cluster	1-ch 11;pg 368-372	PPT
41	Puppet	1-ch 11;pg 372-374	PPT
42	Puppet Case Study - Multi-tier Deployment	1-ch 11;pg 374-377	PPT
43	NETCONF-YANG Case Studies - Steps for IoT device Management with NETCONF-YANG	1-ch 11;pg 377-379	PPT
44	Managing Smart Irrigation IoT System with NETCONF-YANG	1-ch 11;pg 379-392	PPT
45	Managing Home Intrusion Detection IoT System with NETCONF-YANG.	1-ch 11;pg 392-404	PPT

Content beyond syllabus covered (if any):



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REFERENCES:

1. Arshdeep Bahga, Vijay Madiseti, "Internet of Things :A hands on approach", First Edition, Universities Press, 2015.
2. Honbo Zhou,"The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
3. Dieter Uckelmann Mark Harrison; Florian Michahelles, "Architecting the Internet of Things ", Springer, 2011.
4. Srinivasa K. G, Siddesh G. M. , Hanumantha Raju R.,'Internet of Things ',Cengage.

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Designation	Assistant Professor	Professor
Date	24.06.2019	24.06.2019
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD



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