

ITE4003	Internet of Things	L	T	P	J	C
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Pre-requisite	ITE3001	Syllabus version				
		1.0				
Course Objectives:						
<ul style="list-style-type: none"> To explore the design characteristics of IoT, Communication models between processes or applications in heterogeneous environments for engineering problems. To impart knowledge on enabling technologies, techniques, resources and use of modern IT tools for providing IoT based solutions. To apply the contextual knowledge to assess the commercial applications / tools / technologies by considering societal, health, safety, legal and cultural issues for IoT applications. 						
Expected Course Outcome:						
1) Demonstrate the knowledge of fundamental elements and concepts related to Internet of Things.						
2) Analyse the core architectural concepts to meet the challenges in implementing the connected devices.						
3) Describe the industrial sensors, health sensors, etc. programming aspect for the domain specific IoT.						
4) Use and apply important methods in retrieving the sensor data from the cloud and perform analytics.						
5) Provide platforms and methodology for reliability, scalability and robustness in IoT and M2M system management.						
6) Solve Real World Problems by developing a prototype, targeted for Cloud and big data analytics time applications.						
7) Identify and analyze core concepts of IoT Physical Server and cloud offerings.						
8) Design and Develop a Domain Specific Application which will address the contemporary issues, IOT techniques and cloud computing.						
Student Learning Outcomes (SLO): 2, 7, 18						
[2] Having a clear understanding of the subject related concepts and of contemporary issues						
[7] Having computational thinking						
[18] Having critical thinking and innovative skills						
Module:1	Introduction to Internet of Things	6 hours				
Definition & Characteristics of IoT, Physical Design of IoT, Things in IoT, IoT Protocols, Logical Design of IoT, IoT Communication Models, IoT Communication APIs, IoT Enabling Technologies.						
Module:2	IoT Enabling Technologies	6 hours				
Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols.						

Embedded Systems, Embedded Systems, IoT Level-1, IoT Level-2, IoT Level-3, IoT Level-4, IoT Level-5.			
Module:3	Domain Specific IoTs I	6 hours	
Home Automation, Smart Lighting, Smart Appliances, Intrusion Detection, Smoke/Gas Detectors, Cities- Smart Parking, Smart Lighting, Structural Health Monitoring, Surveillance, Environment- Weather Monitoring, Air Pollution Monitoring, Noise Pollution Monitoring, Forest Fire Detection, River Floods Detection.			
Module:4	Domain Specific IoTs II	7 hours	
Energy- Smart Grids, Renewable Energy Systems, Prognostics, Retail- Inventory Management, Smart Payments, Smart Vending Machines, Logistics- Route Generation & Scheduling, Shipment Monitoring, Remote Vehicle Diagnostics, Agriculture- Smart Irrigation, Green House Control, Industry- Machine Diagnosis & Prognosis, Indoor Air Quality Monitoring, Health & Lifestyle, Wearable Electronics.			
Module:5	IoT and M2M	6 hours	
Introduction to M2M, Difference between IoT and M2M, SDN and NFV for IoT, Software Defined Networking, Network Function Virtualization, IoT System Management with NETCONF-YANG, Need for IoT Systems Management, Network Operator Requirements, NETCONF, YANG.			
Module:6	IoT Platforms Design Methodology	6 hours	
Process Specification, Domain Model Specification, Information Model Specification, Service Specifications, IoT Level Specification, Functional View Specification, Operational View Specification, Device & Component Integration, Case Study on IoT System for Weather Monitoring, IoT Physical Devices & Endpoints, Basic building blocks of an IoT Device, Exemplary Device: Raspberry Pi , pcDuino, BeagleBone Black, Cubieboard.			
Module:7	IoT Physical Servers & Cloud Offerings	6 hours	
Introduction to Cloud Storage Models & Communication APIs, WAMP - AutoBahn for IoT, Xively Cloud for IoT, Django Architecture, Starting Development with Django, 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.			
Module:8	Contemporary issues	2 hours	
	Total Lecture hours:	45 hours	
Text Book(s)			
1.	Vijay Madiseti and Arshdeep Bahga, Internet of Things: A Hands-On Approach, VPT edition1, 2014.		
Reference Books			
1.	Jonathan Follett, Designing for Emerging - UX for Genomics, Robotics, and the Internet of Things Technologies, O'Reilly, 2014.		
Recommended by Board of Studies		05-03-2016	
Approved by Academic Council		No. 40	Date 18-03-2016