Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
CEE92A	Internet of Things(IOT)	3	--	--	3	--	--	3
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes		CEL35, CE45, CE52
At the end of successful completion of the course, students will be able to		
Course Outcomes	CO1	Define Internet of Things and its components.
	CO2	Perform IoT Systems management.
	CO3	Design IoT systems through Python, Physical Servers and Cloud Solution.
	CO4	Analyze the system through Data Analytics tools.

Module No.	Unit No.	Topics	Ref.	Hrs.
1	1.1	**Introduction to IoT –** Definition, Characteristics, Physical and Logical Designs, IoT Protocols, IoT Communications Models and API, IoT Enabling Technologies, IoT Levels and Deployment Templates, IoT Examples, M2M	1	3
	1.2	**RFID Technology** – Working of RFID, Components of an RFID system, RFID Transponder (tag) classes, Standards, System architecture, Localization and Handover Management, Technology considerations, Performance Evaluation, Applications	2	4
	1.3	**Wireless Sensor Networks** – History, Sensor Nodes, Connecting Nodes, Networking Nodes, Securing Communication	2	2
2	2.1	**IoT System Management** – SNMP, Network Operator Requirements,	1	3
	2.2	**IoT System Management** – NETCONF, YANG	1	2
	2.3	**IoT Platform Design Specification –** Requirements, Process, Domain Model, Service, IoT Level, Function, Operational view, Device and Component Integration, Application Development	1	3
3	3.1	**IoT Systems Logical Design** – Python Data Types, Type conversion, Control Flow	1	3
	3.2	**IoT Systems Logical Design** – Python Functions, Modules, File Handling, Classes, Python Packages for IoT.	1	2
	3.3	**IoT Physical Servers –** Cloud Storage Models, Communication APIs, WAMP, Xively Cloud, Django	1	3

4	**4.1**	**IoT Cloud Services** - RESTful Web API, Amazon Web Services for IoT	1	2
	4.2	**IoT Data Analytics** – Apache Hadoop, Batch Data Analysis, Hadoop YARN	1	3
	4.3	**IoT Data Analytics** – Apache Oozie, Apache Spark, Apache Storm, Chef, Chef Case Studies, Puppet**,** NETCONF-YANG	1	3
5	**5.1**	**Arduino Programming Building Blocks** – Basics, Internet Connectivity, Communication Protocols.	3	4
	5.2	**IoT Patterns**: Real-time Clients, Remote control, On-demand Clients, Web Apps.	3	3
	5.3	**IoT Patterns:** Machine to Human, Machine to Machine, Platforms	3	2
Total				**42**

In-Semester Examination (ISE): The assessment includes the submission of a term paper by each student on the contemporary work related to Internet of Things.

References:

[1] Arsheep Bahga, Vijay Madisetti, "*internet of Things: A Hands-On Approach*", University Press, FIRST Edition, 2015.

[2] Hakima Chaouchi, "*The Internet of Things: Connecting Objects*", Wiley-ISTE, FIRST Edition, 2010.

[3] Adeel Javed, "*Building Arduino Projects for the Internet of Things: Experiments with Real-World Applications*", Apress, FIRST Edition, 2016.