SANKALCHAND PATEL UNIVERSITY ।। अथातो ज्ञानजिज्ञासा ।।	**FACULTY OF COMPUTER SCIENCE** **Master Of Computer Application (Sem-III)** In Effect from Academic Year 2023-24

Branch Name:	MCA
Program Code:	CS201
Course Title	Internet of Things (IoT) Practical
Course Code	3CS2010306P
Pre-requisite Course:	Before start the IOT students can know about the python programming for practical purpose

Course Objective:

The objectives of the course are to:

- To research the foundational ideas of IoT
- To comprehend the functions of sensors in the Internet of Things
- To understand the various protocols used in IoT design
- Recognize how big data, cloud computing, and data analytics fit into an IoT system in general.
- Recognize the role that IoT plays in different industries.

Teaching Scheme (Hours per week)				**Evaluation Scheme (Marks)**				
				Theory		**Practical**		
Lecture	**Tutorial**	**Practical**	**Credit**	**University Assessment**	**Continuous Assessment**	**University Assessment**	**Continuous Assessment**	**Total**
-	-	3	3	-	-	25	25	50

Sample Practical List

The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.

1. **Start Raspberry Pi and try various Linix commands in command terminal window: ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.**
2. Run some python programs on Pi like:
   a) Read your name and print Hello message with name
   b) Read two numbers and print their sum, difference, product and division.
   c) Word and character count of a given string.
   d) Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input.
3. Run some python programs on Pi like:
   a) Print a name 'n' times, where name and n are read from standard input, using for and while loops.
   b) Handle Divided by Zero Exception.
   c) Print current time for 10 times with an interval of 10 seconds.
   d) Read a file line by line and print the word count of each line.
4. a) Light an LED through Python program
   b) Get input from two switches and switch on corresponding LEDs
   c) Flash an LED at a given on time and off time cycle, where the two times are taken from a file.
5. a) Flash an LED based on cron output (acts as an alarm)
   b) Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.
   c) Get the status of a bulb at a remote place (on the LAN) through web.

List of References:

1. Olivier Hersent,DavidBoswarthick, Omar Elloumi"The Internet of Things key applications and protocols", willey
2. Jeeva Jose, Internet of Things, Khanna Publishing House
3. Michael Miller "The Internet of Things" by Pearson
4. Raj Kamal "INTERNET OF THINGS", McGraw-Hill, 1ST Edition, 2016
5. ArshdeepBahga, Vijay Madisetti "Internet of Things (A hands on approach)" 1ST edition, VPI publications,2014
6. Adrian McEwen,Hakin Cassimally "Designing the Internet of Things" Wiley India

Web Resources

1. https://geekflare.com/internet-of-things-iot-learning-resources
2. https://dev.to/josethz00/learning-iot-0-j84
3. https://github.com/microsoft/IoT-For-Beginners
4. https://letsfindcourse.com/best-iot-tutorials-and-courses

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Demonstrate basic concepts, principles and challenges in IoT.	2 Understanding 3 Applying 4 Analyzing
CLO2	Illustrate functioning of hardware devices and sensors used for IoT.	1 Remembering 2 Understanding
CL03	Analyze network communication aspects and protocols used in IoT.	3 Applying 6 Creating
CLO4	Implement the multithreading concepts in python code.	3 Applying 4 Analyzing 5 Evaluate 6 Creating
CLO5	Apply IoT for developing real life applications using Ardunio programming.	3 Applying 4 Analyzing 5 Evaluate 6 Creating
CLO6	To develop IoT infrastructure for popular applications	5 Evaluate 6 Creating

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CLO1	H	H	L		M		L		L	L	H	M	H	H
CLO2	M	H		L	L		L		M	L	L	M	M	
CLO3	M	H	H	L	L		L		L	L	M	M		M
CLO4	M	H	M	L	L		L		L	L	M	M	H	
CLO5	M	H	H	L	L		L		L	L	M	M		H
CLO6	M	H	H	L	L		L		L	L	M	M		

H: High, M: Medium, L: Low