GANPAT UNIVERSITY

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications	**Branch/Spec.**	Computer Application
Semester	II	**Version**	1.0.0.0
Effective from Academic Year	2024-25	**Effective for the batch Admitted in**	June 2024
Subject Code	P12A4IOT	**Subject Name**	Basics of IoT & Automation

Teaching scheme						**Examination scheme (Marks)**			
(Per week)	**Lecture (DT)**		**Practical (Lab.)**		**Total**		**CE**	**SEE**	**Total**
	L	TU	P	TW					
Credit	2	0	2	0	4	Theory	40	60	100
Hours	2	0	4	0	6	Practical	20	30	50

Objective:

- Student can develop IoT based Application as well as can create IoT solutions using sensors, actuators and devices

Pre-requisites:

- Basic knowledge of Internet, Automation, Sensors and devices, Computer Networking

Course Outcomes :

- **1 = Slight (Low); 2 = Moderate (Medium); 3 = Substantial (High); "-" = No Correlation**

Name of CO	**Description**
CO1	Describe the fundamental concepts, architecture, and applications of Internet of Things (IoT) and Industrial IoT.
CO2	Analyze the role of IoT technologies in automation system architecture and industrial digitization.
CO3	Design and implement IoT solutions using sensors, actuators, and embedded devices.
CO4	Integrate IoT hardware with wireless networking and cloud platforms for data acquisition and monitoring.

Mapping of CO and PO

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	2	1	1	-	-	-	2
CO2	1	3	2	2	-	1	-	1
CO3	3	2	3	3	2	-	-	1
CO4	2	2	3	3	1	-	-	2

Content:

Unit	**Section - I**	Hrs

1	**Introduction to Internet of Things and Industrial IoT:** Definition of IoT, IoT Key Characteristics, Advantages and Disadvantages, IoT Hardware and Software(Embedded), IoT Protocols, IoT Eco System, IoT Framework, IoT Common uses, Introduction, Industry 4.0, IIoT, IIoT Architecture, Basic Technologies, Applications and Challenges	9
2	**IoT and Automation:** Automation System Architecture, Current trends in automation system, Future automation system requirements, Next Generation automation system and digitisation technology (IoT and SoS).	6
	Section – II	
3	**Arduino Simulation Environments and Sensors:** Architecture, IDE setup, Writing Arduino Software, Arduino Libraries, Basics of Embedded C Programming for Arduino, Interfacing LED, push button and buzzer with Arduino interfacing Arduino with LCD, Working of Sensors, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensor with Arduino.	9
4	**Basic Networking with ESP8266 Wi-Fi module and Cloud for IoT:** Basics of Wireless Networking, Introduction to ESP8266 Wi-Fi Module, Various Wi-Fi library, Web server-introduction, installation, configuration Posting sensor(s) data to web server, Cloud Architecture, Cloud computing benefits, Cloud Services-SaaS, Paas, Iaas, Thing Speak API and MQTT, Interfacing ESP8266 with Web services.	6

Practical Content:

List of programs specified by the subject teacher based on above mentioned topics.

Text Books:

1	The Internet of Things: "Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press), 2017.
2	"Internet of Things: A Hands on Approach", by Arshdeep Bahga and Vijay Madisetti (Universities Press). 2014.
3	"Arduino Project Handbook", Volume 2: 25 Simple Electronics Projects for Beginners by Mark Geddes, 2017.

Reference Books:

1	IoT Automation: Arrowhead Framework 1st Edition 2017 CRC Press
2	IOT (Internet of Things) Programming: A Simple and Fast Way of Learning IOT David Etter 2016
3	IoT for Beginners by Vibha Soni BPB 2021
4	Industry 4.0 The Industrial Internet of Things by Alasdair Gilchrist 1st Edition Apress 2017
5	"Internet of Things (IoT): Systems and Applications" by Jamil Y. Khan, Memhm et. R. Yuce, (CRC Press), 2019.
6	https://www.javatpoint.com/iot-internet-of-things
7	https://www.plantautomation-technology.com/articles/impact-of-internet-of-things-on-industrial-automation
8	https://create.arduino.cc/projecthub/KMsaifullah/virtual-arduino-simulation-ce1bd2
9	https://www.elprocus.com/esp8266-wi-fi-module/
10	https://www.geeksforgeeks.org/iot-and-cloud-computing/

MOOC/Certification Courses:

1	https://www.udemy.com/
2	https://www.coursera.org/
3	https://online.stanford.edu/courses/xee100-introduction-internet-things
4.	https://nptel.ac.in/courses/106104242

Question Paper Scheme:

University Examination Duration: 3 Hours

Note for Examiner: -

(I) Questions 1 and 4 are compulsory with no options.

(II) Internal options should be given in questions 2, 3, 5 and 6.

SECTION – I

Q.1 –8 Marks

Q.2 –11 Marks

Q.3 –11 Marks

SECTION - II

Q.4 –8 Marks

Q.5 –11 Marks

Q.6 –11 Marks