GANPAT UNIVERSITY

FACULTY OF COMPUTER APPLICATIONS

Programme	Master of Computer Applications	**Branch/ Spec.**	Computer Application
Semester	III	**Version**	1.0.0.0
Effective from Academic Year	2024-25	**Effective for the batch Admitted in**	June 2024
Subject Code	P13A5ITA	**Subject Name**	IoT Advanced

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:

- Students can explore the IoT value chain structure (device, data cloud), application areas
- Technologies involved with the help of preparing projects designed for the Raspberry Pi.

Pre-requisites:

- Basic knowledge of various technologies used in IoT, industrial IoT, IoT with Automation, working with Arduino, basic networking with ESP8266 and cloud for IoT.

Course Outcomes:

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

Name of CO	Description
CO1	Explain and analyze IoT concepts, enabling technologies, architectures, and domain-specific applications across smart homes, cities, industry, healthcare, and agriculture.
CO2	Design and evaluate IoT architectures using M2M concepts, SDN/NFV, fog computing, and cloud platforms to address scalability and deployment challenges.
CO3	Develop IoT solutions by integrating physical devices, cloud services, data analytics, AI concepts, and Python-based web APIs.
CO4	Analyze and apply IoT testing strategies and security mechanisms to identify vulnerabilities,

	cyberattacks, and mitigation techniques in real-world IoT systems.
	Mapping of CO and PO

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3	2	1	2	–	–	–	2
CO2	2	3	3	3	1	–	–	2
CO3	2	2	3	3	2	–	–	2
CO4	2	3	2	2	–	–	3	2

Content Theory Syllabus:

Unit	SECTION-I	Hrs
1	**Internet of Things and Domain Specific:** What is Internet of Things? Various technologies used in IoT, IoT Revolution, Benefits of IoT, Physical Design vs. Logical Design of IoT, IoT Enabling Technologies, IoT Level and Deployment Templates, IoT and Robotic Work Automation, Future of IoT, Case Study, Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifecyle, Public Safety	8
2	**IoT and M2M, Design Methodology and Architecture for IoT Platforms:** IoT vs. M2M, SDN and NFV for IoT, IoT Design Patterns, Challenges and Solutions for Designing Architecture for IoT, Four Layer Architecture vs. Seven Layer Architecture, Fog Computing, Dilemma, Open Stack Cloud Architecture, Role of Cloud in IoT	7
	SECTION-II	
3	**IoT Physical Device, Endpoints, Cloud Offering and Data Analytics:** Building blocks of an IoT Device, About the Raspberry Pi, Raspberry Pi interface, Programming Raspberry Pi with Python, Cloud Storage and Communication APIs, Python Web Application Framework-Django, Restful Web API**,** Introduction, Apache Hadoop, what is AI? Types of AI, AI and IoT a logical combination, IoT and AI in context of industry 4.0	9
4	**Testing in IoT and Security Challenges for IoT:** Types of Testing in IoT, IoT Testing Challenges, IoT Testing Tools, Test Automation in IoT, case study, Botnet, working of Mirai, Spam Emails, How Ransomware attack works in IoT, Medical IoT device, MITM in IoT, DDOS attack in IoT, IP Spoofing, Targeting Cameras in IoT, Anatomy of an Cyber Attack, case study	6

Practical Content:

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

Text Books:

1	Internet of Things: A Hands-on Approach Book by Arshdeep Bahga and Vijay K. Madisetti Publisher : Orient Blackswan Private Limited - New Delhi; First edition (1 January 2015).
2	Internet of Things- Architecture, Implementation, and Security book by Mayur Ramgir Publisher : Pearson Education; First edition (21 August 2019).

Reference Books:

1	IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things book by -Hanes David,Salgueiro Gonzalo, Grossetete Patrick,Cisco Press 1st Edition 2017.
2	Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud book by William Stallings Publisher : Addison-Wesley Professional; 1st edition (8 November 2015).

MOOC/Certification Courses:

1	https://nptel.ac.in/courses/108106190

2	https://www.edx.org/
3	https://www.vlab.co.in/
4	https://www.udemy.com/
5	https://www.lynda.com.cach3.com/

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