WORKSHOP REPORT

Title: WORKSHOP ON IoT AND EMBEDDED APPLICATIONS

Dates: 18/02/2025 to 20/02/2025 (03 Days) 10 am to 5 pm

Venue: AI & DS Laboratory

Resource Person: 1. L DHINAKAR, Technical Engineer,
IobiT Solutions India Pvt Ltd (https://iobit.in/)
2. Shridhar Reddy, Technical Engineer,
IobiT Solutions India Pvt Ltd (https://iobit.in/)

Convenor: Dr.Gajendran M Chairperson /AI & DS

Co-Ordinator: Prof. Anandkumar AP/ AI & DS

Total Participants: 32 [M.Tech – CSE(Co-Ed and Women's), AI & DS, DCN(Women's), VLSI, MCA, B.Tech AI & DS]

Mode: Offline

Objective:

The Hands-On Training Program on IoT & Embedded Applications offers a comprehensive understanding of IoT systems, covering embedded C programming, ESP32 interfacing with sensors and actuators, and cloud integration with platforms like Blynk and ThingSpeak. Participants will explore advanced concepts such as Industrial IoT and LoRaWAN, enabling them to design scalable solutions for smart agriculture, industrial automation, and environmental monitoring. By the end, attendees will be skilled in developing end-to-end IoT applications and leveraging long-range communication technologies for real-world use cases.

DESCRIPTION OF THE PROGRAM:

A three-day workshop on **"IoT and Embedded Applications"** was conducted from **18th to 20th February 2025** at the **Department of Artificial Intelligence and Data Science, FET (Co-Ed), Sharnbasva University, Kalaburagi**. The workshop provided hands-on training and insights into IoT and embedded systems for real-world implementations. A total of **32**

participants, including students from **M.Tech CSE (Co-Ed and Women's), AI & DS, DCN (Women's), VLSI, MCA, and B.Tech AI & DS** departments, along with faculty members, actively participated in the program. The workshop covered essential topics such as embedded C programming, sensor and actuator interfacing, cloud integration, and long-range IoT technologies, enabling participants to gain practical skills and knowledge for developing IoT-based solutions.

Day 1: 18/02/2025

Session 1: 10 am to 11.30 am

The first session focused on an **introduction to IoT and embedded applications**. The resource person provided an overview of IoT (Internet of Things) and its significance in modern technology. The discussion highlighted embedded systems, which are typically microcontroller-based devices designed to perform specific tasks, such as controlling hardware, processing sensor data, and managing communication protocols. The session laid the foundation for understanding how embedded systems form the backbone of IoT applications, enabling real-world solutions across various domains.

Fig 1. First session on introduction

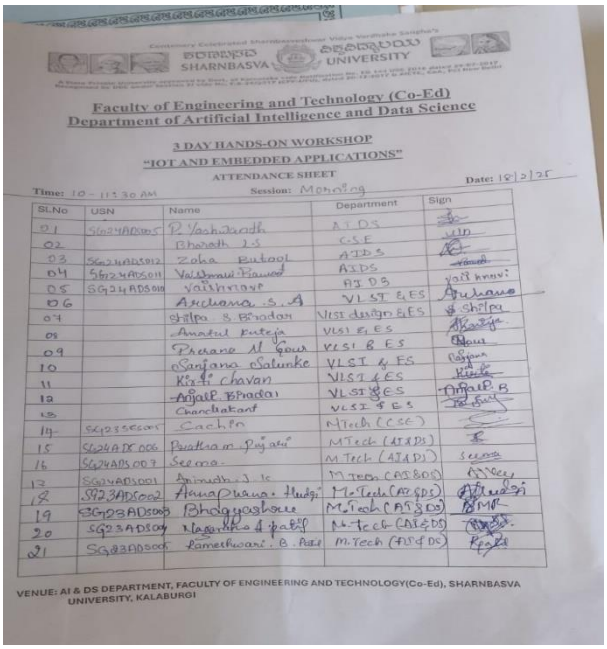

Faculty of Engineering and Technology (Co-Ed)
Department of Artificial Intelligence and Data Science
3 DAY HANDS-ON WORKSHOP
"IOT AND EMBEDDED APPLICATIONS"
ATTENDANCE SHEET
Time: 10 - 11:30 AM Session: Morning Date: 18/2/25
VENUE: AI & DS DEPARTMENT, FACULTY OF ENGINEERING AND TECHNOLOGY(Co-Ed), SHARNBASVA UNIVERSITY, KALABURGI

Fig 2. First session attendance

Session 2: 11:30 AM to 1:00 PM

The inaugural workshop began at 11:30 AM. The event was chaired by:

- **Prof. Anilkumar Bidve**, Vice Chancellor of SUK
- **Dr. V. D. Mytri**, Director of SUK
- **Dr. S. G. Dollegoudar**, Registrar of SUK
- **Dr. Gajendran M**, Chairperson of the AI & DS Department

The inaugural song was performed by **Ms. Ashwini**. All the guests lit the lamp, and **Dr. Anand N. P.** welcomed the attendees. The Chief Guest, **Prof. Anilkumar Bidve**, addressed the gathering, and **Prof. Revati** extended a vote of thanks to all. The entire event was hosted by **Ms. Seema**.

Fig3. Glimpses of Inaugural

Session 3: 2:00 PM to 3:30 PM **Session 4: 3. 45 pm to 5.15 pm**

On Day 1, the third session and fourth session were conducted by the resource person, who provided hands-on training to the participants. During this session, participants installed essential software required for the workshop, such as **Arduino IDE** and **Pololu**. They were introduced to the basics of working with sensors, actuators, and the **ESP32 board**. The session focused on practical exercises, allowing participants to gain firsthand experience in connecting and programming these components. By the end of the session, attendees had a clear understanding of how to set up and interface the ESP32 with various devices. This foundational knowledge prepared them for more advanced tasks in the subsequent days of the workshop.

Fig 4. Afternoon sessions

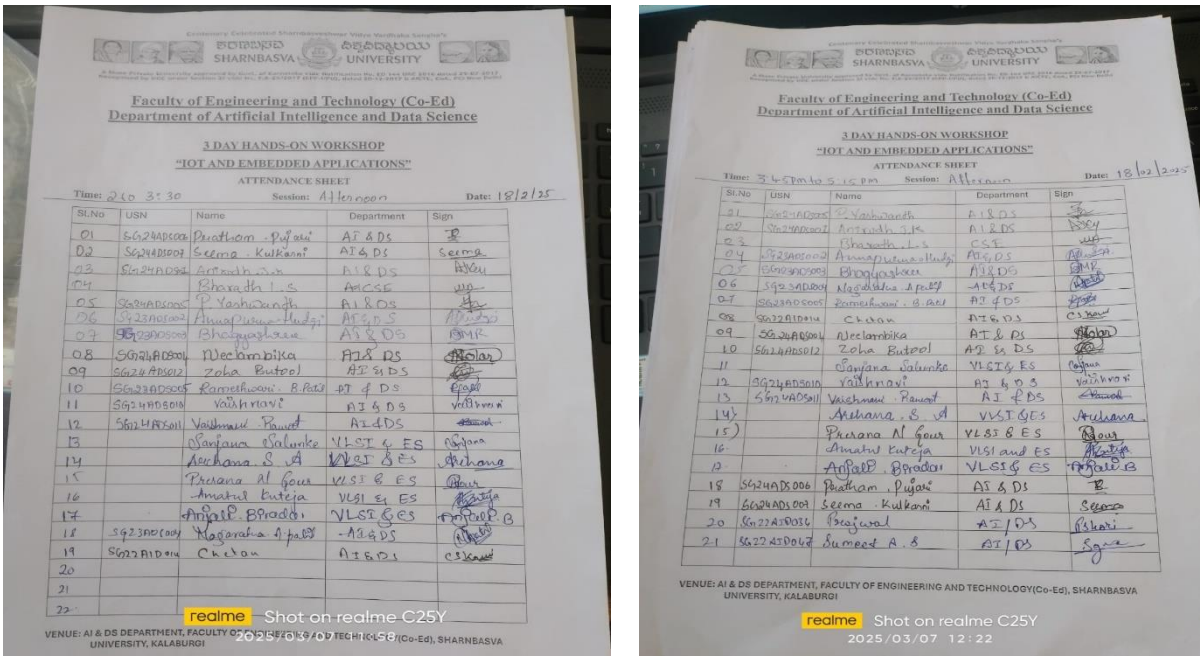


Fig 5. Afternoon session attendance

Day 2: 19/02/2025 **Sessions: 4 [Each 1 hour 30 min]**

On the second day, four sessions were conducted, each lasting one and a half hours. The resource person explained various programs and conducted hands-on training throughout the day. Participants enthusiastically engaged in the sessions, actively making connections and executing programs. The resource person addressed all queries related to the sessions, ensuring that the participants gained a thorough understanding of the concepts. The interactive and engaging nature of the sessions made the day both enjoyable and rewarding for all attendees.

The participants worked on the following interfacing programs:

* Hands-On: Interface ESP32 with LED, Buzzer, SWITCH

* Hands-On: Interface ESP32 with LED, IR

* Hands-On: Interface ESP32 with Ultrasonic sensor

* Hands-On: Interface ESP32 with Temperature sensor

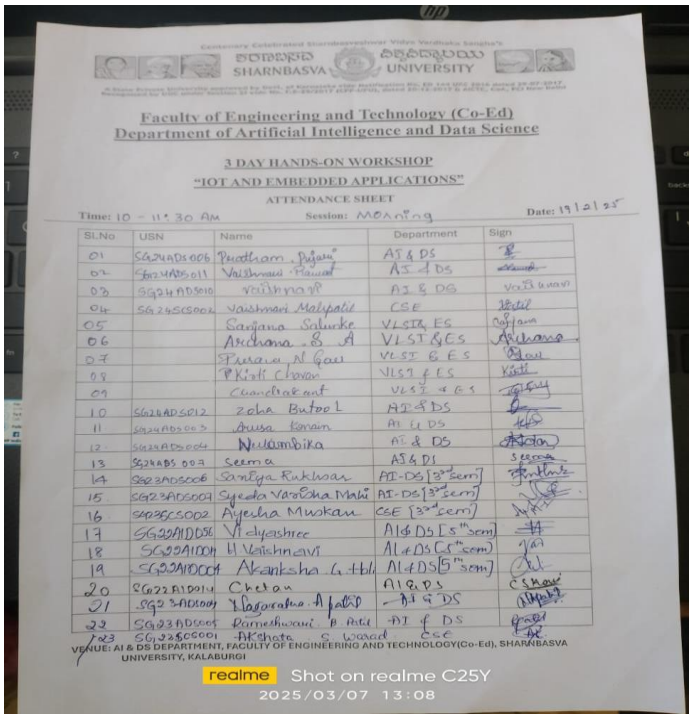
* Hands-On: Interface ESP32 with Humidity sensor

* Hands-On: Interface ESP32 with Servo motor

Key Takeaways from the Day:

1. **Practical Skills**: Participants gained hands-on experience in interfacing various sensors and actuators with the ESP32.
2. **Understanding GPIO Pins**: Learned how to configure and use GPIO pins for both input and output operations.
3. **Sensor Integration**: Understood the working principles of common sensors (e.g., IR, ultrasonic, temperature, humidity) and their real-world applications.
4. **Problem-Solving**: Developed the ability to troubleshoot and debug circuits and code during hands-on activities.
5. **Interactive Learning**: The resource person's guidance and interactive approach ensured that all participants understood the concepts and could apply them effectively.
6. **Confidence Building**: Participants became more confident in working with the ESP32 and exploring its capabilities for IoT and embedded systems projects.

Fig 6. Second day all sessions



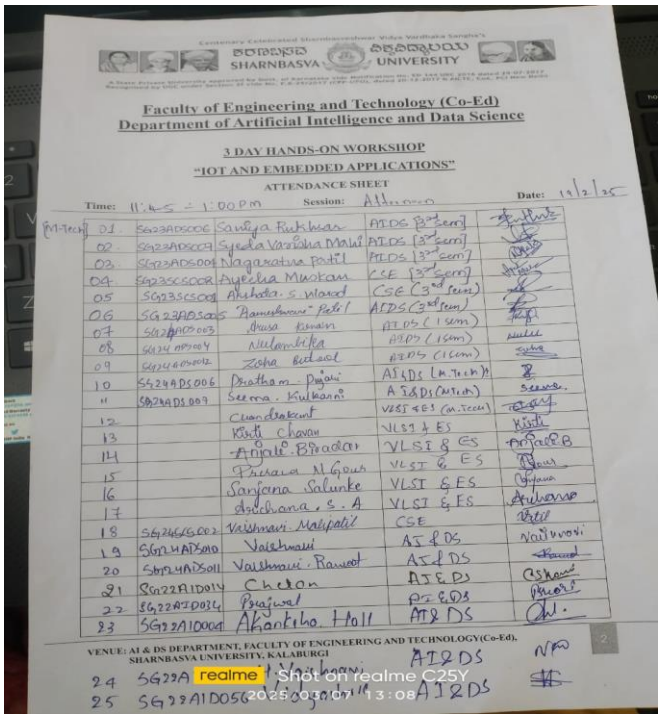
Faculty of Engineering and Technology (Co-Ed)
Department of Artificial Intelligence and Data Science

3 DAY HANDS-ON WORKSHOP
"IOT AND EMBEDDED APPLICATIONS"
ATTENDANCE SHEET

Time: 10 - 11.30 AM Session: Morning Date: 19/2/25

Sl.No	USN	Name	Department	Sign
01	SG24ADS006	Pratham Pujari	AI & DS	
02	SG24ADS011	Vaishnavi Rawoot	AI & DS	
03	SG24ADS010	Vaishnavi	AI & DS	
04	SG24CSS002	Vaishnavi Malipatil	CSE	
05		Sanjana Salunke	VLSI & ES	
06		Archana S A	VLSI & ES	
07		Bhavana N Gour	VLSI & ES	
08		PKirti Chavan	VLSI & ES	
09		Chandrakant	VLSI & ES	
10	SG24ADS012	Zoha Butool	AI & DS	
11	SG24ADS003	Ahsa Rehan	AI & DS	
12	SG24ADS004	Nelambika	AI & DS	
13	SG24ADS 009	Seema	AI & DS	
14	SG23ADS006	Sanjya Rukhsar	AI-DS [3rd sem]	
15	SG23ADS009	Syeda Varsha Mahi	AI-DS [3rd sem]	
16	SG23CSS002	Ayesha Muskan	CSE [3rd sem]	
17	SG22AIDS06	Vidyashree	AI&DS [5th sem]	
18	SG22AIDS01	H Vaishnavi	AI&DS [5th sem]	
19	SG22AIDS04	Akanksha Hatti	AI&DS [5th sem]	
20	SG22AIDS14	Chetan	AI&DS	
21	SG23AIDS09	Bhagyashree A Patil	AI & DS	
22	SG23ADS005	Rameshwari B Patil	AI & DS	
23	SG23CSS001	Akshata S Warad	CSE	

VENUE: AI & DS DEPARTMENT, FACULTY OF ENGINEERING AND TECHNOLOGY(Co-Ed), SHARNBASVA UNIVERSITY, KALABURGI



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Department of Artificial Intelligence and Data Science

3 DAY HANDS-ON WORKSHOP
"IOT AND EMBEDDED APPLICATIONS"
ATTENDANCE SHEET

Time: 11.45 - 1.00 PM Session: Afternoon Date: 19/2/25

Sl.No	USN	Name	Department	Sign
01	SG23ADS006	Sanjya Rukhsar	AIDS [3rd sem]	
02	SG23ADS009	Syeda Varsha Mahi	AIDS [3rd sem]	
03	SG23ADS004	Nagarathna Patil	AIDS [3rd sem]	
04	SG23CSS001	Ayesha Muskan	CSE [3rd sem]	
05	SG23CSS002	Akshata S Warad	CSE [3rd sem]	
06	SG23ADS005	Rameshwari Patil	AIDS [3rd sem]	
07	SG22AIDS03	Ahsa Rehan	AIDS (1sem)	
08	SG24ADS004	Nelambika	AIDS (1sem)	
09	SG24ADS012	Zoha Butool	AIDS (1sem)	
10	SG24ADS006	Pratham Pujari	AI&DS [M.Tech]	
11	SG24ADS009	Seema Kulkarni	AI&DS (M.Tech)	
12		Chandrakant	VLSI & ES (M.Tech)	
13		Kirti Chavan	VLSI & ES	
14		Anjali Biradar	VLSI & ES	
15		Bhavana N Gour	VLSI & ES	
16		Sanjana Salunke	VLSI & ES	
17		Archana S A	VLSI & ES	
18	SG24CSS002	Vaishnavi Malipatil	CSE	
19	SG24ADS010	Vaishnavi	AI & DS	
20	SG24ADS011	Vaishnavi Rawoot	AI & DS	
21	SG22AIDS14	Chetan	AI & DS	
22	SG22AIDS24	Brajwal	AI & DS	
23	SG22AIDS04	Akanksha Hatti	AI & DS	
24	SG22A		AI&DS	
25	SG22AIDS06		AI&DS	

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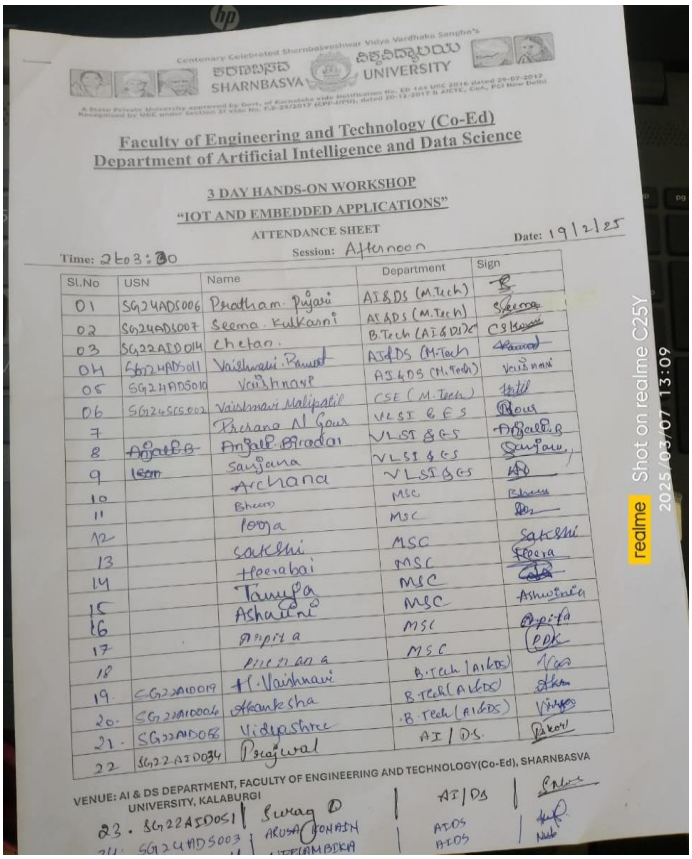

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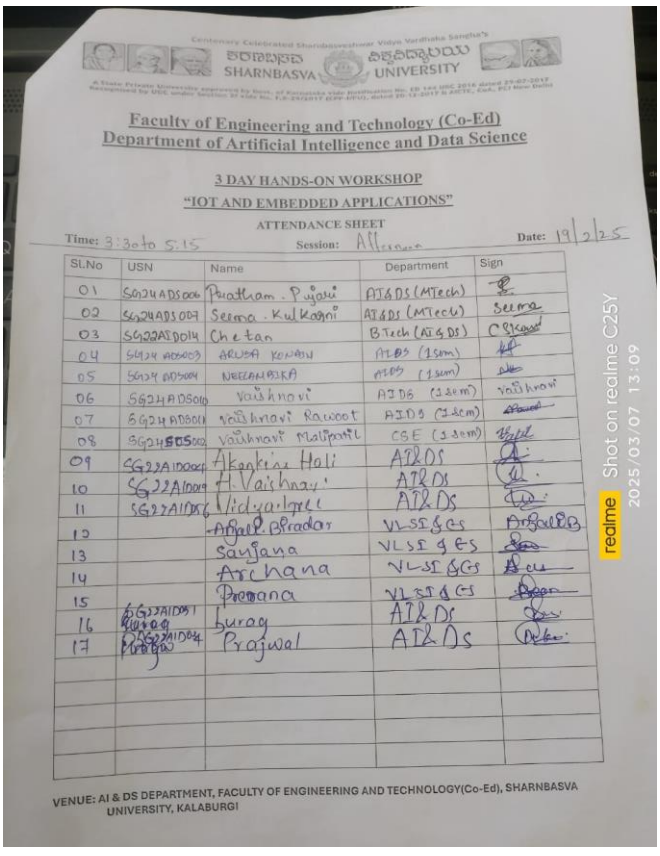
3 DAY HANDS-ON WORKSHOP
"IOT AND EMBEDDED APPLICATIONS"
ATTENDANCE SHEET

Time: 2 to 3:30 Session: Afternoon Date: 19/2/25

Sl.No	USN	Name	Department	Sign
01	SG24ADS006	Pratham Pujari	AI&DS (M.Tech)	
02	SG24ADS007	Seema Kulkarni	AI&DS (M.Tech)	
03	SG22AIDS14	Chetan	B.Tech (AI&DS)	
04	SG24ADS011	Vaishnavi Rawoot	AI&DS (M.Tech)	
05	SG24ADS010	Vaishnavi	AI&DS (M.Tech)	
06	SG24CSS002	Vaishnavi Malipatil	CSE (M.Tech)	
7		Bhavana N Gour	VLSI & ES	
8		Anjali Biradar	VLSI & ES	
9		Sanjana	VLSI & ES	
10		Archana	VLSI & ES	
11		Bheem	MSC	
12		Pooja	MSC	
13		Sakshi	MSC	
14		Hoorabai	MSC	
15		Tanuja	MSC	
16		Ashwini	MSC	
17		Deepika	MSC	
18		Priyanka	B.Tech (AI&DS)	
19	SG22AIDS01	H. Vaishnavi	B.Tech (AI&DS)	
20	SG22AIDS04	Akanksha	B.Tech (AI&DS)	
21	SG22AIDS06	Vidyashree	AI / DS	
22	SG22AIDS24	Brajwal		
23	SG22AIDS05	Suraj D	AI/DS	
24	SG24MDS003	ARUSA JONAIN	AIDS	

VENUE: AI & DS DEPARTMENT, FACULTY OF ENGINEERING AND TECHNOLOGY(Co-Ed), SHARNBASVA UNIVERSITY, KALABURGI



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Time: 3:30 to 5:15 Session: Afternoon Date: 19/2/25

Sl.No	USN	Name	Department	Sign
01	SG24ADS006	Pratham Pujari	AI&DS (MTech)	
02	SG24ADS007	Seema Kulkarni	AI&DS (MTech)	
03	SG22AIDS14	Chetan	B.Tech (AI&DS)	
04	SG24 ADS003	ARUSA JONAIN	AIDS (1sem)	
05	SG24 ADS004	NEELAMBIKA	AIDS (1sem)	
06	SG24ADS010	Vaishnavi	AIDS (1sem)	
07	SG24ADS011	Vaishnavi Rawoot	AIDS (1sem)	
08	SG24CSS002	Vaishnavi Malipatil	CSE (1sem)	
09	SG22AIDS04	Akanksha Hali	AI&DS	
10	SG22AIDS01	H. Vaishnavi	AI&DS	
11	SG22AIDS06	Vidyashree	AI&DS	
12		Anjali Biradar	VLSI & ES	
13		Sanjana	VLSI & ES	
14		Archana	VLSI & ES	
15		Bhavana	VLSI & ES	
16	SG22AIDS01	Suraj	AI&DS	
17	SG22AIDS24	Brajwal	AI&DS	

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Fig 7. Day 2 attendances

Day 3: 20/02/2025 **Sessions: 4 [Each 1 hour 30 min]**

On Day 3, the resource person continued the training on ESP32 board programming and introduced the Raspberry Pi board. Additionally, an introduction to the ThingSpeak cloud platform was provided.

The following programs were discussed during the sessions:

1. 7 segment display
2. Bluetooth connectivity
3. WiFi connectivity
4. DHT sensor to display temperature and humidity
5. ThingSpeak cloud to read temperature and humidity and display them

Key Takeaways from the Session

1. ESP32 Programming: Participants gained hands-on experience with advanced ESP32 functionalities such as Bluetooth, WiFi, and sensor integration.
2. ThingSpeak Cloud: Learned how to send and visualize IoT data on a cloud platform.
3. Raspberry Pi Introduction: Understood the basics of Raspberry Pi and its potential use cases.
4. Practical Applications: The programs discussed have real-world applications in home automation, environmental monitoring, and IoT projects.

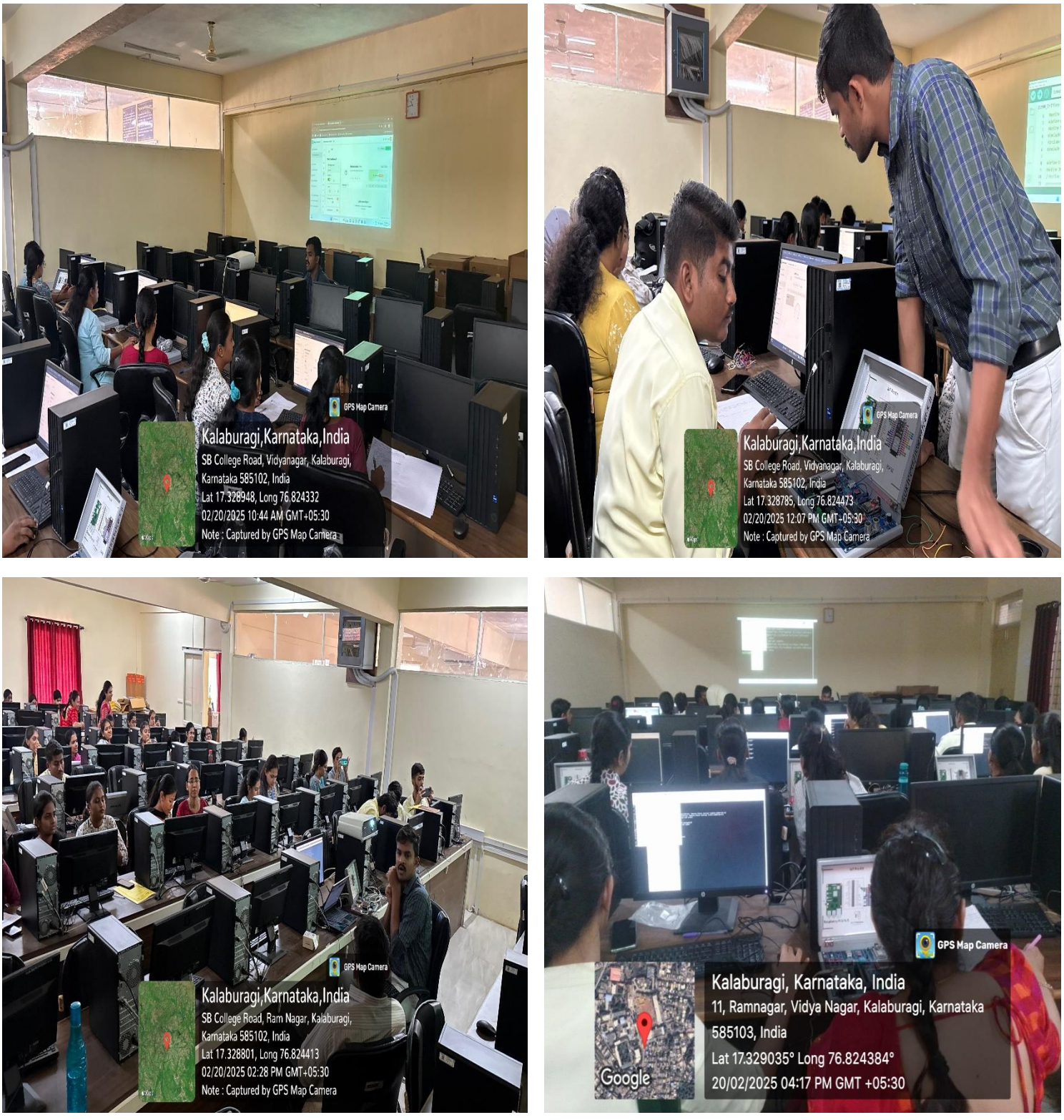

Fig 8 . Day 3 all sessions images

Centenary Celebrated Sharnbasveshwar Vidya Vardhaka Sangha's

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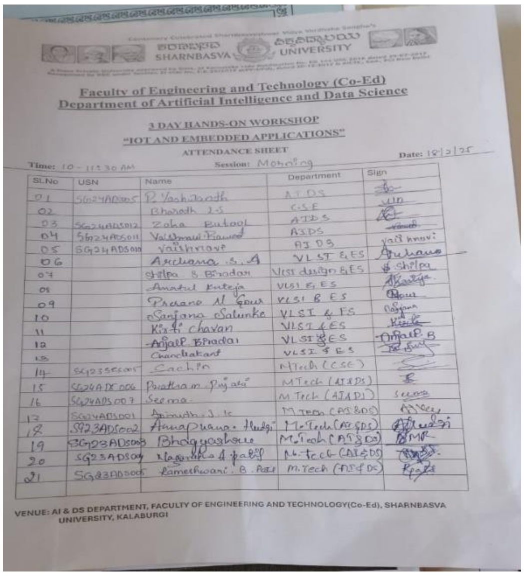
SHARNBASVA UNIVERSITY

A State Private University approved by Govt. of Karnataka vide Notification No. ED 144 URC 2016 dated 29-07-2017
Recognised by UGC under Section 2f vide No. F.8-29/2017 (CPP-I/PU), dated 20-12-2017 & AICTE, CoA, PCI New Delhi

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE



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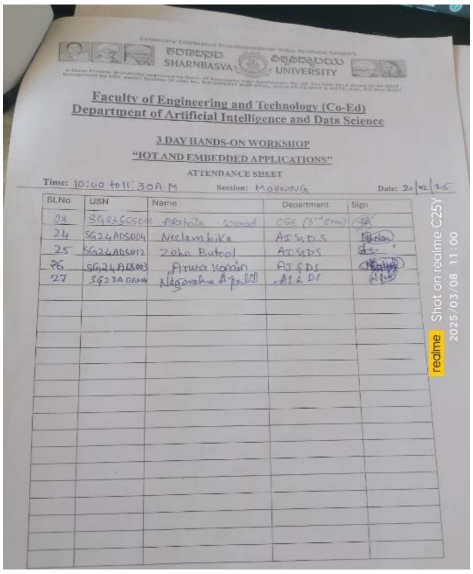

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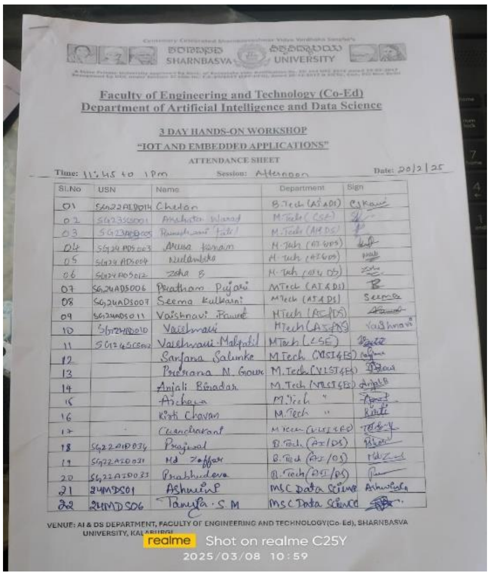

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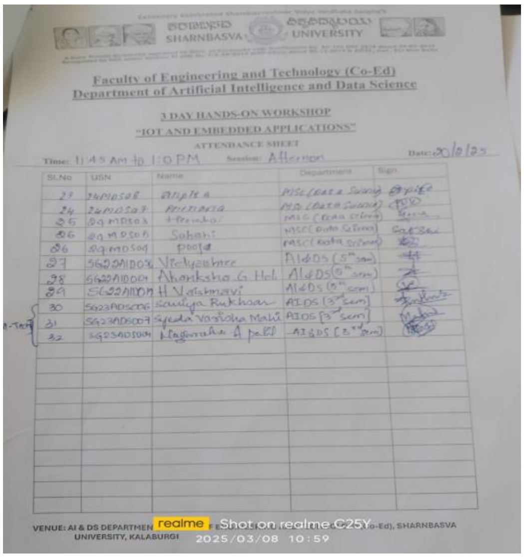

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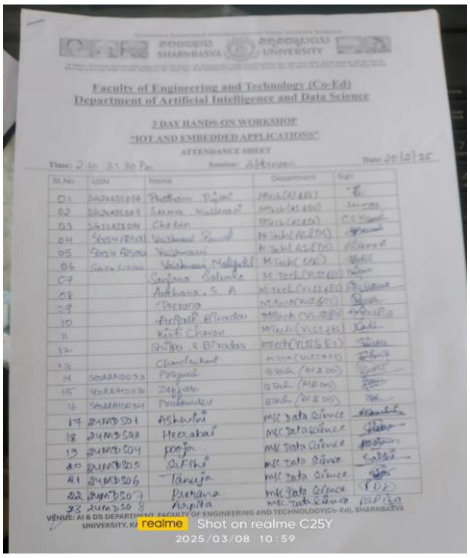

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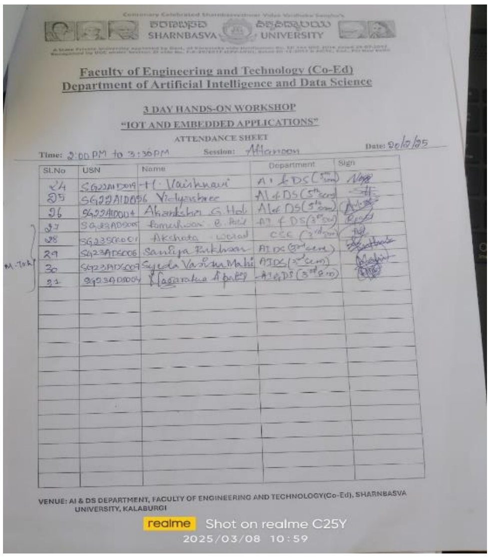

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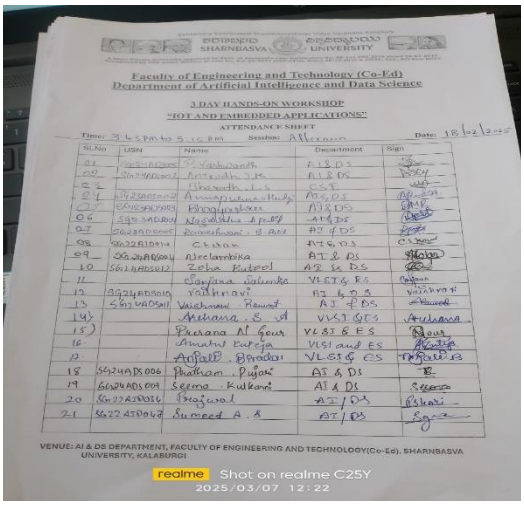

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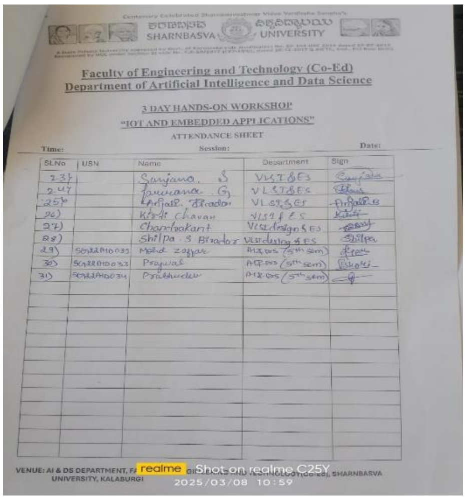

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Course Outcome:

By the end of the program, participants will gain hands-on experience in developing IoT-based solutions using ESP32, interfacing with sensors and actuators, and integrating data with cloud platforms for real-world applications.

Program Outcome (PO) Alignment:

1. **PO1: Engineering Knowledge**
    - Participants gain practical knowledge of IoT systems, embedded programming, and hardware interfacing, which aligns with applying engineering principles to solve real-world problems.
2. **PO2: Problem Analysis**
    - By working on hands-on projects involving sensors, actuators, and cloud integration, participants learn to analyze and solve technical challenges in IoT applications.
3. **PO3: Design/Development of Solutions**
    - The program emphasizes designing and developing IoT-based solutions, such as interfacing ESP32 with sensors/actuators and integrating data with cloud platforms, which aligns with creating effective solutions for complex problems.
4. **PO4: Conduct Investigations of Complex Problems**
    - Participants engage in DIY sessions and hands-on experiments, which involve investigating and troubleshooting real-world IoT applications.
5. **PO5: Modern Tool Usage**
    - The use of tools like ESP32, Arduino IDE, Blynk, ThingSpeak, and various sensors/actuators ensures participants are proficient in using modern engineering tools and technologies.
6. **PO6: The Engineer and Society**

- By developing IoT solutions for applications like smart agriculture, industrial automation, and environmental monitoring, participants understand the societal impact of their work.

7. **PO7: Environment and Sustainability**
   - IoT applications like environmental monitoring and smart agriculture align with creating sustainable and environmentally friendly solutions.
8. **PO11: Lifelong Learning**
   - The program equips participants with foundational skills and knowledge, encouraging them to continue learning and adapting to advancements in IoT and embedded systems.

IoT AND Embedded Application	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS0 1	PSO 2	PSO 3
CO1	3	2	3	1	3	1	1				3				

Sample Certificate