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# **NAAC DOCUMENTS**



Quality Indicator Frame Work

# Criterion – 2

## **Teaching-Learning and Evaluation**

Submitted by

# IQAC Internal Quality Assurance Cell

Sri Bharathi Engineering College for Women



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Criteria 2

**Teaching-Learning and Evaluation** 

350

## **Key Indicator- 2.3. Teaching- Learning Process (40)**

# 2022-2023

# ELECTRONICS AND COMMUNICATION ENGINEERING

# **PARTICIPATIVE LEARNING**

| Activity                     | Number of Students<br>Attended | Page No. |
|------------------------------|--------------------------------|----------|
| Value Added Course (VAC)     | 62                             | 3        |
| Symposium<br>and<br>Workshop | 23                             | 75       |
| TOTAL STUDENTS ATTENDED      | 85                             | -        |



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Criteria 2

**Teaching-Learning and Evaluation** 

350

**Key Indicator- 2.3. Teaching- Learning Process (40)** 

# 2022-2023

# ELECTRONICS AND COMMUNICATION ENGINEERING

## **PARTICIPATIVE LEARNING**

# **VALUE ADDED COURSE**



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN (Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25) Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR 2022-2023/ODD SEMESTER

### DEPARTMENT CIRCULAR Date: 09.08.2022

Value Added Course offered by the Department of ECE will be conducted for Second year students on "**Real-time Sensor Data Processing with Python for IoT Applications**" in association with Galwin technology from 22.8.2022 to 26.08.2022. Certificates will be issued to the eligible participants at the end of the programme.

| S.No | Name of the Course  | Resource Person   |
|------|---|---|
| 1    | Real-time Sensor Data<br>Processing with Python<br>for IoT Applications | Er.K.GOPALAKRISHNAN,<br>Embedded cum AI Developer,<br>Galwin Technology,<br>12A, Periyasamy Towers, 3rd floor,<br>Chathiram Bus Stand,<br>Trichy- 620 002.<br>Tamil Nadu .<br>Mail.Id: info@galwintech.in |

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303.

Dr. S.THALACAVATH M.E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- II Year ECE Students
- Notice Board



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#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION

#### ENGINEERING

#### Academic Year 2022-20223/ODD Semester

### "Real-time Sensor Data Processing with Python for IoT Applications "

#### **SYLLABUS**

| S.NO | TOPIC COVERED  | DURATION<br>(in hours) | DATE  |
|------|--|------------------------|---|
| 1    | Overview of the Internet of Things (IoT) and its applications  | 2                      | 22.8.22                                       |
| 2    | Basic Python syntax, data types, and control structures, Functions,<br>modules, and libraries in Python,<br>Handling sensor data in Python using built-in data structures  | 1                      | 22.8.22                                       |
| 3    | Real-time requirements in IoT applications,<br>Concepts of buffering, sampling rate, and data<br>acquisition, Techniques for efficient handling and processing of<br>real-time sensor data   | 3                      | 22.8.22                                       |
| 4    | Introduction to various types of sensors used in IoT<br>applications, Techniques for interfacing sensors with<br>microcontrollers or single-board computers, Reading and acquiring<br>sensor data using Python libraries and modules | 3                      | 23.8.22                                       |
| 5    | Filtering and noise reduction techniques for sensor data, Statistical<br>analysis and feature extraction from sensor readings, Real-time data<br>visualization using Python libraries (e.g., Matplotlib, Plotly)                     | 3                      | 23.8.22                                       |
| 6    | Challenges of processing large-scale sensor data streams,<br>Introduction to stream processing frameworks (e.g., Apache Kafka,<br>Apache Flink),<br>Techniques for distributed processing of sensor                                  | 3                      | 24.8.22                                       |
| 7    | Interfacing Python with IoT communication protocols  | 3                      | 24.8.22                                       |
| 8    | Real-time data aggregation, anomaly detection, and predictive analytics  | 3                      | 25.8.22                                       |
| 9    | Integrating real-time sensor data processing with IoT platforms using Python   | 3                      | 25.8.22                                       |
| 10   | Data storage, visualization, and remote monitoring of sensor data in IoT applications  | 3                      | 26.8.22                                       |
| 11   | Security and Privacy in Real-time Sensor Data Processing   | 3                      | 26.8.22                                       |
|      | Total Hours  | 30                     | Street all all all all all all all all all al |



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HoD/ECE

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### DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING ACADEMIC YEAR ODD SEMESTER (2022-2023)

#### STUDENT PARTICIPATION LIST FOR VALUE ADDED PROGRAM

#### **Real-time Sensor Data Processing with Python for IoT Applications**

| S.NO | REG.NO       | NAME           | YEAR &<br>BRANCH |
|------|--------------|----------------|------------------|
| 1    | 912621106001 | AMRIN M        | II&ECE           |
| 2    | 912621106002 | BHUVANESWARI C | II&ECE           |
| 3    | 912621106003 | DHANYASHREE A  | II&ECE           |
| 4    | 912621106004 | KALAIVANI R    | II&ECE           |
| 5    | 912621106005 | KAVIYA K       | II&ECE           |
| 6    | 912621106006 | KEERTHANA V    | II&ECE           |
| 7    | 912621106007 | PAVITHRA P     | II&ECE           |
| 8    | 912621106008 | RAJESHWARI R   | II&ECE           |
| 9    | 912621106009 | SUBALAKSHMI M  | II&ECE           |
| 10   | 912621106010 | SUGUNA C       | II&ECE           |
| 11   | 912621106301 | JAYAPRIYA M    | II&ECE           |
| 12   | 912621106302 | KIRUBASHINI C  | II&ECE           |

VAC Coordinator

Dr. S.THILAGAVATHI ME., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

HoD/

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303



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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR ODD SEMESTER (2022-2023)

ATTENDANCE SHEET FOR VALUE ADDED PROGRAM - Real-time Sensor Data Processing with Python for IoT Applications

| S.No R   | EG. NO    | NAME           | YEAR/    | 22.8 | .2022                         | 23.8.             | 2022         | 24.8. | 2022 | 25.0 | 8.2022      | 26.08 | 8.2022        | No. of<br>Sessions | Sign of        |
|----------|-----------|----------------|----------|------|-------------------------------|-------------------|--------------|-------|------|------|-------------|-------|---------------|--------------------|----------------|
|          |           |                | BRANCH   | F.N  | A.N                           | F.N               | A.N          | F.N   | A.N  | F.N  | A.N         | F.N   | A.N           | Attended           | Student        |
| 1 9126   | 621106001 | AMRIN M        | II/ECE   | a    | 1                             | 1                 | 1            | 1     | 1    | 1    | 1           | 1     | 1             | a                  | M.Awm          |
| 2 9126   | 621106002 | BHUVANESWARI C | II/ECE   | 1    | 1                             | 1                 | 1            | a     | 1    | 1    | 1           | 1     | 1             | 9                  | C-Bhuray       |
| 3 - 9126 | 621106003 | DHANYASHREE A  | II/ECE   | 1    | 1                             | 1                 | 1            | 1     | 1    | a    | a           | 1     | 1             | 8                  | A »Dhy         |
| 4 9126   | 621106004 | KALAIVANI R    | II/ECE   | 1    | 1                             | a                 | 1            | 1     | 1    | 1    | 1           | 1     | 1             | 9                  | zkajaivani . F |
| 5 9126   | 621106005 | KAVIYA K       | II/ECE   | ,    | 1                             | a                 | a            | 1     | 1    | 1    | 1           | 1     | ,             | 8                  | K. Kaviya      |
| 6 9126   | 621106006 | KEERTHANA V    | II/ECE   | a    | 1                             | 1                 | 1            | 1     | 1    | 1    | 1           | 1     | ,             | 9                  | Vikeof.        |
| 7 9126   | 621106007 | PAVITHRA P     | II/ECE   | 1    | 1                             | 1                 | 1            | 1     | 1    | 1    | 1           | 1     | 1             | 10                 | P. Pasithma    |
| 8 9126   | 621106008 | RAJESHWARI R   | II/ECE   | 1.   | 1                             | 1                 | 1            | 1     | 1    | a    | 1           | 1     | 1             | 9                  | R.R.J.         |
| 9 9126   | 621106009 | SUBALAKSHMI M  | II/ECE   | 1    | 1                             | 1                 | 1            | 1     | 1    | a    | 1           | 1     | 1             | 9                  | memy           |
| 10 9126  | 621106010 | SUGUNA C       | II/ECE   | 1    | ,                             | /                 | 1            | 1     | 1    | 1    | 1           | 1     | 1             | 10                 | CoSugar        |
| 11 9126  | 621106301 | JAYAPRIYA M    | II/ECE   | a    | ,                             | 1                 | 1            | 1     | 1    | 1    | 1           | 1     | 1             | 9                  | 124            |
| 12 9126  | 621106302 | KIRUBASHINI C  | ∧ II/ECE | 1    | 1                             | 1                 | 1            | 1     | 1    | 1    | 1           | 1     | ,             | 10                 | Kistery.       |
| 12 9120  |           | VACCO          | the      | SRII | HILAO<br>PI<br>BHARA<br>OLLEG | RINCIP.<br>THI EN | AL<br>GINEEI | RING  | /    | 1    | /<br>SHODHE |       | ECE<br>NGIŃEE |                    | fra            |

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| time Sei   | nsor Data Pro  | cessing  | g with P   | ython for Io  | T App   | olications in H  | ECE  |  |
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| ar Hall  | , Ground Flo   | oor, Sl  | BECW   |   |   |  |  |  |
| ta proce<br>ficiency<br>the abili<br>ication v<br>out diffe<br>thon .Ex<br>ts succe  | ssing.<br>in collecting,<br>ty to interface<br>vith the IoT nor<br>rent commun<br>plore techniqu   | proces<br>senso<br>etwork<br>ication<br>ues for  | ssing, an<br>ors with<br>t.<br>n protoc<br>handlin   | nd analyzing<br>microcontro<br>ols used in 1<br>ng and mana   | g senso<br>ollers o<br>oT sys<br>aging l  | or data in real<br>or embedded<br>stems and the<br>arge volumes  | -time<br>systen<br>ir imp<br>s of ser  | using Python.<br>ns and establish<br>lementation<br>nsor data in   |
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processing.<br>ficiency in collecting, process<br>the ability to interface sensor<br>ication with the IoT networks<br>out different communication<br>thon .Explore techniques for<br>the successfully completed the<br>the successfully completed the successfully completed the<br>the successfully completed the successfully completed the<br>the su | time Sensor Data Processing with P<br>Er.K.GOPALAKRISHNAN,<br>Embedded cum IoT Developer,<br>Galwin Technology,<br>Trichy- 620 002.<br>from : 22.8.2022 To:<br>the senset is the sense of | time Sensor Data Processing with Python for Icd:Er.K.GOPALAKRISHNAN,<br>Embedded cum IoT Developer,<br>Galwin Technology,<br>Trichy- 620 002.from :22.8.2022To:26.08.2022from :Electronics and Communication End:2Semester:ODDNo.nar Hall, ,Ground Floor, SBECWome of Value Added Course (VAC) :At the end of<br>nd the fundamentals of IoT (Internet of Things)<br>ics and Communication Engineering<br>thon programming language and its specific lib<br>ata processing.ficiency in collecting, processing, and analyzing<br>the ability to interface sensors with microcontrol<br>ication with the IoT network.<br>out different communication protocols used in I<br>thon .Explore techniques for handling and mana<br>c. | time Sensor Data Processing with Python for IoT App         Er.K.GOPALAKRISHNAN,         Embedded cum IoT Developer,         Galwin Technology,         Trichy- 620 002.         from :       22.8.2022         To:       26.08.2022         rtment :       Electronics and Communication Engineer         :       2         Semester:       ODD         No. of Stute         nar Hall, ,Ground Floor, SBECW         ome of Value Added Course (VAC) :At the end of Cour         nd the fundamentals of IoT (Internet of Things) and it         ics and Communication Engineering         thon programming language and its specific libraries and processing.         ficiency in collecting, processing, and analyzing sensed the ability to interface sensors with microcontrollers or ication with the IoT network.         out different communication protocols used in IoT systhon .Explore techniques for handling and managing lag. | Er.K.GOPALAKRISHNAN,         Embedded cum IoT Developer,         Galwin Technology,         Trichy- 620 002.         from :       22.8.2022         To:       26.08.2022         Duration:         rtment :       Electronics and Communication Engineering         :       2         Semester:       ODD         No. of Students Register         ome of Value Added Course (VAC) : At the end of Course , Students of not the fundamentals of IoT (Internet of Things) and its applications is and Communication Engineering         thon programming language and its specific libraries and frameworata processing.         ficiency in collecting, processing, and analyzing sensor data in real the ability to interface sensors with microcontrollers or embedded ication with the IoT network.         out different communication protocols used in IoT systems and the thon .Explore techniques for handling and managing large volumes of the successfully completed the VAC course is 12 Students based of the sense of the successfully completed the VAC course is 12 Students based of the sense of the successfully completed the VAC course is 12 Students based of the sense of the successfully completed the VAC course is 12 Students based of the sense of the successfully completed the VAC course is 12 Students based of the sense of the successfully completed the VAC course is 12 Students based of the sense of the successfully completed the VAC course is 12 Students based of the sense of the se | time Sensor Data Processing with Python for IoT Applications in ECE           Er.K.GOPALAKRISHNAN,           Embedded cum IoT Developer,           Galwin Technology,           Trichy- 620 002.           from :         22.8.2022           To:         26.08.2022           Duration:         30 F           rtment :         Electronics and Communication Engineering           :         2         Semester:         ODD           No. of Students Registered :         nar Hall, ,Ground Floor, SBECW           ome of Value Added Course (VAC) : At the end of Course ,Students can able and the fundamentals of IoT (Internet of Things) and its applications in the cs and Communication Engineering           thon programming language and its specific libraries and frameworks for a processing.           ficiency in collecting, processing, and analyzing sensor data in real-time the ability to interface sensors with microcontrollers or embedded system ication with the IoT network.           out different communication protocols used in IoT systems and their imp thon .Explore techniques for handling and managing large volumes of sense. |



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Name of the Student : M. Subalakshmi

Year/Sem: IL III

AU Register Number: 91262110 6009

Value Added Course on

"Real-time Sensor Data Processing with Python for IoT Applications"

#### MCQ QUESTIONS (20X1 = 20 Marks)

- 1. Which of the following is a key advantage of real-time sensor data processing in IoT applications?
  - a) Improved data storage for historical analysis
  - b) Reduced dependency on cloud services
  - c) Lower sensor data accuracy
  - A Faster decision-making and response time

2. In real-time data processing, which Python library is commonly used for asynchronous programming?

- a) NumPy
- b) Pandas
- X Asyncio
- d) Requests

What is the primary function of a data broker in real-time sensor data processing for IoT?

- a) Data visualization
- b) Data storage
- c) Data encryption
- d) Data routing and distribution

Which Python data structure is suitable for efficiently storing sensor data in real-time?

- a) List
- b) Set
- c) Dictionary
- d) Array

Which communication protocol is commonly used for real-time data streaming between IoT devices?

GAVATHIM.E., PK.D.

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- a) HTTP
- by MOTT
- c) FTP
- d) SMTP

What is the role of a "timestamp" in real-time sensor data processing?

Dr. S.TH

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- a) It indicates the sensor's physical location.
- b) It specifies the type of sensor used.
- c) It helps track the time when data was collected.
- d) It encrypts the sensor data for security.

7 Which of the following is an example of an IoT sensor used for environmental monitoring?

- a) Heart rate sensor
- b) Proximity sensor
- CO2 sensor
- d) RFID sensor

8. In real-time sensor data processing, what does the term "latency" refer to?

- a) Sensor accuracy
- b) Data storage capacity
- Time delay in data processing and transmission
- d) Sensor resolution

9. Which Python library is commonly used for real-time data visualization?

- va) Matplotlib
- b) Seaborn
- c) Plotly
- d) SciPy

10. What is the purpose of data preprocessing in real-time sensor data processing?

- a) To make the data available for public access
- b) To eliminate noise and outliers from the sensor data
- c) To physically calibrate the sensors
- d) To encrypt the data for secure transmission

11. Which IoT component is responsible for transforming analog sensor data into digital format?

- a) Actuator
- b) Microcontroller

Gateway

d) Data broker

12. What does the term "Data Fusion" mean in the context of real-time sensor data processing?

- Combining data from multiple sensors to obtain more accurate and reliable information
- b) Encrypting the sensor data during transmission

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- c) Performing statistical analysis on sensor data
- d) Storing sensor data in a centralized database
- 13. In IoT applications, what is the primary function of an actuator?
  - a) To collect sensor data
  - b) To process sensor data
  - To control physical devices based on sensor readings
  - d) To store sensor data

لل. Which Python library is commonly used for machine learning tasks in real-time sensor data processing?

- a) TensorFlow
- b) Keras
- CY Scikit-learn
- d) PyTorch

15. What is the significance of Quality of Service (QoS) in MQTT communication for realtime sensor data?

- A) It ensures data integrity during transmission
- b) It determines the type of sensor used for data collection
- c) It specifies the size of the sensor data buffer
- d) It controls the order of data transmission between sensors and brokers

16. Which of the following is an example of a time-series sensor data application in IoT?

- a) Object detection in images
- b) Voice recognition
- c) Temperature monitoring over time
- d) Text classification

17. What is the primary purpose of using Python for real-time sensor data processing in IoT applications?

- a) To reduce overall hardware costs
- b) To enable real-time data visualization
- c) To simplify data storage and retrieval
- d) To provide a flexible and powerful programming environment

18. Which Python library allows easy integration of IoT devices with cloud services for data processing?

- a) Tornado
- b) Twisted
- c) Boto3
- d) Requests

No. What is the typical role of edge computing in real-time sensor data processing for IoT applications?

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- a) Reducing data transmission speed
- b) Offloading data processing to local devices
- c) Storing data in a centralized cloud server
- d) Minimizing data encryption overhead

20. In real-time sensor data processing, what does the term "data sampling rate" refer to?

- a) The time it takes to process sensor data
- b) The accuracy of the sensor data
- The frequency at which sensor data is collected
- d) The size of the data buffer used for storage

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#### DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING

#### ACADEMIC YEAR ODD SEMESTER (2022-2023)

#### MARK SHEET FOR VALUE ADDED COURSE- REAL-TIME SENSOR DATA PROCESSING WITH PYTHON FOR IOT APPLICATIONS

|      | DECISTED           |                | YEAR        |                               | idance<br>A)   | VAC -MC                    |                | OVERALL<br>MARK(100)                  |
|------|--------------------|----------------|-------------|-------------------------------|----------------|----------------------------|----------------|---------------------------------------|
| S.NO | REGISTER<br>NUMBER | NAME           | &<br>BRANCH | No.of<br>Sessions<br>Attented | Marks<br>(100) | No.of<br>Correct<br>Answer | Marks<br>(100) | MARK(100)<br>(50% of A +<br>50% of B) |
| 1    | 912621106001       | AMRIN M        | II & ECE    | 9                             | 90             | 16                         | 80             | 85                                    |
| 2    | 912621106002       | BHUVANESWARI C | II & ECE    | 9                             | 90             | 18 -                       | 90             | 90                                    |
| 3    | 912621106003       | DHANYASHREE A  | II & ECE    | 8                             | 80             | 17                         | 85             | 83                                    |
| 4    | 912621106004       | KALAIVANI R    | II & ECE    | 9                             | 90             | 14                         | 60             | 75                                    |
| 5    | 912621106005       | KAVIYA K       | II & ECE    | 8                             | 80             | 0 15                       | 75             | 78                                    |
| 6    | 912621106006       | KEERTHANA V    | II & ECE    | 9                             | 90             | 15                         | 75             | 83                                    |
| 7    | 912621106007       | PAVITHRA P     | II & ECE    | 10                            | 100            | 18                         | 90             | 95                                    |
| 8    | 912621106008       | RAJESHWARI R   | II & ECE    | 9                             | 90             | 15                         | 75             | 83                                    |
| 9    | 912621106009       | SUBALAKSHMI M  | II & ECE    | 9                             | 90             | 15                         | 75             | 83                                    |
| 10   | 912621106010       | SUGUNA C       | II & ECE    | 10                            | 100            | 19                         | 95             | 98                                    |
| 11   | 912621106301       | JAYAPRIYA M    | II & ECE    | 9                             | 90             | 17                         | 85             | 88                                    |
| 12   | 912621106302       | KIRUBASHINI C  | II & ECE    | 10                            | 100            | 13                         | 65             | 83                                    |

VAC Coordinator

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Dr. S.THILAGAVATIAI M.E., ALD., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

HoD/ ECE

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN



## **CERTIFICATE OF COMPLETION**

## VALUE ADDED COURSE

This is to Certify that Mr/Ms. **SUGUNA.C** of **II ECE** has successfully completed Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications" organized by the Department of Electronics and Communication Engineering in association with Galwin Technology from 22.08.2022 to 26.08.2022 during the academic year 2022-2023.

**Managing Director** Galwin Technology

HoD/ECF

SBECW

Dr. S.THILAGAVATHI M.E. Ph.D. SBECW PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

Principal



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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR 2022-2023/ODD SEMESTER

### DEPARTMENT CIRCULAR Date: 27.07.2022

Value Added Course offered by the Department of ECE will be conducted for third and final Year students on "**Real-time Sensor Data Processing with Python for IoT Applications**" in association with Galwin technology from 03.08.2022 to 09.08.2022. Certificates will be issued to the eligible participants at the end of the programme.

| S.No | Name of the Course  | Resource Person   |
|------|---|---|
| 1    | Real-time Sensor Data<br>Processing with Python<br>for IoT Applications | Er.K.GOPALAKRISHNAN,<br>Embedded cum AI Developer,<br>Galwin Technology,<br>12A, Periyasamy Towers, 3rd floor,<br>Chathiram Bus Stand,<br>Trichy- 620 002.<br>Tamil Nadu .<br>Mail.Id: info@galwintech.in |

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DE S.THILACOVATHI M.E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- III & IV Year ECE Students
- Notice Board



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#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION

#### ENGINEERING

### Academic Year 2022-2023/ODD Semester

### "Real-time Sensor Data Processing with Python for IoT Applications "

#### **SYLLABUS**

| S.NO | TOPIC COVERED  | DURATION<br>(in hours) | DATE    |
|------|--|------------------------|---------|
| 1    | Overview of the Internet of Things (IoT) and its applications  | 2                      | 03.8.22 |
| 2    | Basic Python syntax, data types, and control structures, Functions,<br>modules, and libraries in Python,<br>Handling sensor data in Python using built-in data structures  | 1                      | 03.8.22 |
| 3    | Real-time requirements in IoT applications,<br>Concepts of buffering, sampling rate, and data<br>acquisition, Techniques for efficient handling and processing of<br>real-time sensor data   | 3                      | 03.8.22 |
| 4    | Introduction to various types of sensors used in IoT<br>applications, Techniques for interfacing sensors with<br>microcontrollers or single-board computers, Reading and acquiring<br>sensor data using Python libraries and modules | 3                      | 04.8.22 |
| 5    | Filtering and noise reduction techniques for sensor data, Statistical analysis and feature extraction from sensor readings   | 3                      | 04.8.22 |
| 6    | Challenges of processing large-scale sensor data streams,<br>Introduction to stream processing frameworks (e.g., Apache Kafka,<br>Apache Flink)  | 3                      | 05.8.22 |
| 7    | Real-time data visualization using Python libraries (e.g., Matplotlib, Plotly)   | 3                      | 05.8.22 |
| 8    | Techniques for distributed processing of sensor  | 3                      | 06.8.22 |
| 9    | Interfacing Python with IoT communication protocols  | 3                      | 06.8.22 |
| 10   | Real-time data aggregation, anomaly detection, and predictive analytics  | 3                      | 08.8.22 |
| 11   | Integrating real-time sensor data processing with IoT platforms using Python   | 3                      | 08.8.22 |
| 12   | Data storage, visualization, and remote monitoring of sensor data in IoT applications  | 3                      | 09.8.22 |
| 13   | Security and Privacy in Real-time Sensor Data Processing   | 3                      | 09.8.22 |
|      | Total Hours  | 36                     |         |



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### DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING ACADEMIC YEAR ODD SEMESTER (2022-2023)

### STUDENT PARTICIPATION LIST FOR VALUE ADDED PROGRAM

### **Real-time Sensor Data Processing with Python for IoT Applications**

| S.NO | REG.NO       | NAME            | YEAR &<br>BRANCH |
|------|--------------|-----------------|------------------|
| 1    | 912620106001 | ABIRAMI S       | III &ECE         |
| 2    | 912620106002 | ANUSHYA M       | III &ECE         |
| 3    | 912620106003 | ARTHI S         | III &ECE         |
| 4    | 912620106004 | JEYASRI K       | III &ECE         |
| 5    | 912620106006 | SENPAGAHARINI V | III &ECE         |
| 6    | 912620106007 | SONIYA P        | III &ECE         |
| 7    | 912620106301 | ABITHA S        | III &ECE         |
| 8    | 912620106302 | DESIKA G        | III &ECE         |
| 9    | 912620106303 | SABAREESWARI S  | III &ECE         |
| 10   | 912619106001 | AASHIMA M       | IV& ECE          |
| 11   | 912619106002 | ANANTHI P       | IV& ECE          |
| 12   | 912619106004 | JAFFARNISHA R   | IV& ECE          |
| 13   | 912619106005 | MAHESWARI K     | IV& ECE          |
| 14   | 912619106006 | MANISHA S       | IV& ECE          |
| 15   | 912619106007 | MEGAVADHANA A   | IV& ECE          |
| 16   | 912619106008 | PRIYANGA R      | IV& ECE          |
| 17   | 912619106009 | RAGAVI V        | IV& ECE          |
| 18   | 912619106010 | RAJAPRABA M     | IV& ECE          |
| 19   | 912619106011 | SASIKA K        | IV& ECE          |

oordinator

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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR ODD SEMESTER (2022-2023)

## ATTENDANCE SHEET FOR VALUE ADDED PROGRAM - Real-time Sensor Data Processing with Python for IoT Applications

| REG. NO      |  | NAME  | NAME   | VEID   | 3.8.  | 2022  | 4.8.  | 2022  | 5.8.2  | 2022   | 6.8.   | 2022   | 8.8.   | 2022  | 9.8.20   | 22   | No. of | <b>C</b> ! |
|--------------|--|---|--|--|---|---|---|---|--|--|--|--|--|---|--|--|--------|------------|
|              |  | YEAR/<br>BRANCH   | F.N  | A.N  | F.N   | A.N   | F.N   | A.N   | F.N  | A.N  | F.N  | A.N  | F.N  | A.N   | Attended   | Sign<br>Stud   |        |            |
| 912620106001 | ABIRAMI S  | III/ECE   | 1  | 1  | 1   | 1   | 1   | 1   | 1  | 1  | 1  | 1  | 1  | 1   | 10   | 1 m  |        |            |
| 912620106002 | ANUSHYA M  | III/ECE   | a  | a  | 1   | 1   | ,   | ,   | 1  | ,  | 1  | 1  | 1  | ,   |  | S.A<br>M.Anu   |        |            |
| 912620106003 | ARTHI S  | III/ECE   | 1  | 1  | 1   | ,   | ,   | ,   | ,  | ,  | 1  | Y ,  | 1  | 1   |  | S.AT   |        |            |
| 912620106004 | JEYASRI K  | III/ECE   | 1  | ٨  | 1   | ,   | ;   | ,   | a  | ,  | 1  | 1  | 1  | 1   |  | K.Fr   |        |            |
| 912620106006 | SENPAGAHARINI V  | III/ECE   | 1  | 1  | 1   | ,   | ,   | ,   | a  | a  | 1  | 1  | ,  | 1   |  | 12m  |        |            |
| 912620106007 | SONIYA P   | III/ECE   | 1  | 1  | 1   | 1   | ,   | ,   | 1  | ,  | 1  | 1  | 1  | 1   | 1  | PS   |        |            |
| 912620106301 | ABITHA S   | III/ECE   | 1  | 1  | a   | 1   | ,   | 1   | 1  | ,  | 1  | 1  | ,  | 1   |  |  |        |            |
| 912620106302 | DESIKA G   | III/ECE   | a  | a  | 1   | 1   | ,   | ,   | 1  | ,  | 1  |  | 1  | ,   | 10   | Xbij   |        |            |
| 912620106303 | SABAREESWARI S   | III/ECE   | 1  | ,  | 1   | ,   | ,   | ,   | 1  | 1  | 1  | 1  | ,  | ,   |  | 5.80   |        |            |
| 912619106001 | AASHIMA M  | IV/ECE  | 1  | 1  | ,   | 1   | ,   | -   | 1  |  | 1  | 1  |  |   |  |  |        |            |
| 912619106002 | ANANTHI P  | IV/ECE  | ,  | ,  | 0   | a   | ,   | 1   | ,  | ,  | 1  | 1  | >  | 1   |  | Aard   |        |            |
| 912619106004 | JAFFARNISHA R  | V/ECE   | -  | ,  | 1   | 1   | 1   | 1   | 1  | 1  | 1  | ,  | ,  | 1   |  | Ar Ar  |        |            |
| 912619106005 |  | HIVACAVA<br>PRINCIP   | HIM.   | E.,Ph.D  |   | 7   | ,   | 1   | a  |  |  | 1  | /  | ,   |  | R.S.   |        |            |
|              | 912620106001<br>912620106002<br>912620106003<br>912620106004<br>912620106006<br>912620106007<br>912620106301<br>912620106302<br>912619106001<br>912619106002<br>912619106004 | 912620106001       ABIRAMI S         912620106002       ANUSHYA M         912620106003       ARTHI S         912620106004       JEYASRI K         912620106006       SENPAGAHARINI V         912620106007       SONIYA P         912620106301       ABITHA S         912620106302       DESIKA G         912620106303       SABAREESWARI S         912619106001       AASHIMA M         912619106002       ANANTHI P         912619106004       JAFFARNISHA R | YEAR/<br>BRANCH912620106001ABIRAMI SIII/ECE912620106002ANUSHYA MIII/ECE912620106003ARTHI SIII/ECE912620106004JEYASRI KIII/ECE912620106006SENPAGAHARINI VIII/ECE912620106007SONIYA PIII/ECE912620106301ABITHA SIII/ECE912620106302DESIKA GIII/ECE912619106001AASHIMA MIV/ECE912619106002ANANTHI PIV/ECE912619106004JAFFARNISHA RV/ECE | REG. 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NO         NAME         YEAR/<br>BRANCH         F.N         A.N         F.N         A.N           912620106001         ABIRAMI S         III/ECE         /         /         /         /           912620106002         ANUSHYA M         III/ECE         /         /         /         /           912620106003         ARTHI S         III/ECE         /         /         /         /           912620106004         JEYASRI K         III/ECE         /         /         /         /           912620106006         SENPAGAHARINI V         III/ECE         /         /         /         /           912620106006         SENPAGAHARINI V         III/ECE         /         /         /         /           912620106007         SONIYA P         III/ECE         /         /         /         /           912620106301         ABITHA S         III/ECE         /         /         /         /           912620106302         DESIKA G         III/ECE         /         /         /         /           912619106001         AASHIMA M         IV/ECE         /         /         /         /           912619106002         ANANTHI P         IV/ECE <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N         A.N         F.N           912620106001         ABIRAMI S         III/ECE         /</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         Image: Final stress of the stress of the</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N</td> <td>REG. NO         NAME         YEAR/<br/>BRANCH         F.N         A.N         F.N</td> | REG. 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| 1 | 912619106006 | MANISHA S     | IV/ECE | a | a | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 | 8149 |
|---|--------------|---------------|--------|---|---|---|---|---|---|---|---|---|---|---|---|----|------|
| 5 | 912619106007 | MEGAVADHANA A | IV/ECE | 1 | 1 | 1 | 1 | 1 | , | 1 | 1 | 1 | 1 | 1 | 1 | 12 | 1047 |
| 5 | 912619106008 | PRIYANGA R    | IV/ECE | 1 | 1 | a | 1 | 1 | , | 1 | 1 | 1 | 1 | 1 | 1 | 11 | RD   |
| 7 | 912619106009 | RAGAVI V      | IV/ECE | 1 | 1 | a | a | 1 | 1 | 1 | 1 | 1 | 1 | , | 1 | 10 | Ruot |
| 3 | 912619106010 | RAJAPRABA M   | IV/ECE | 1 | 1 | 1 | , | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 | KING |
| ) | 912619106011 | SASIKA K      | IV/ECE | a | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1) | M:50 |

Coordinator

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303

Dr. S.THILAGAVATHI M.E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.



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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

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|   |   |  | Report of  | n `   | Valu   | e Added C   | ourse  |   |  |  |  |
|---|---|--|--|---|--|---|--|---|--|--|--|
| Title:  | Real-time Sensor Data Processing with Python for IoT Applications in ECE  |  |  |   |  |   |  |   |  |  |  |
| Resource I  |   | Embo<br>Galw   | .GOPALAKE<br>edded cum IoT<br>vin Technology<br>y- 620 002.  | Dev   |  |   |  |   |  |  |  |
| Date of co  | nduct from  | :  | 03.8.2022  |   | To:  | 09.08.2022  | Duration:  | 30 H  | Iours  |  |  |
| Organized   | Departmen   | nt :   | Electronics an   | nd C  | Commu  | nication Engine   | eering   | 36.0  |  |  |  |
| Participant   | Year: 3/  | 4  | Semester:  | 01  | DD   | No. of S  | tudents Regist   | ered :  | 19   |  |  |
| Venue:  | Seminar H   | lall,  | ,Ground Floo   | r, SI   | BECW   |   |  |   |  |  |  |
| <ul> <li>Ele</li> <li>Lea sen</li> <li>Gai</li> <li>Dev con</li> <li>Lea usin real</li> <li>No. of s</li> </ul> | derstand the<br>ctronics and<br>arn Python p<br>sor data pro-<br>in proficien<br>velop the ab<br>nmunication<br>arn about di<br>ng Python .1<br>I-time. | e fur<br>d Cc<br>prog<br>ocess<br>cy in<br>oility<br>n wi<br>ffere<br>Expl | adamentals of I<br>ommunication I<br>ramming langu<br>sing.<br>In collecting, pro-<br>to interface set<br>th the IoT network<br>one techniques | oT (<br>Engi<br>lage<br>oces<br>onsoi<br>vork.<br>tion<br>for | Interne<br>neering<br>and its<br>sing, ar<br>rs with<br>protoco<br>handlin   | At the end of Co<br>t of Things) and<br>specific libraries<br>ad analyzing sen<br>microcontrollers<br>ols used in IoT sy<br>g and managing<br>course is <u>19 Stu</u> | its applications<br>s and framewor<br>sor data in real<br>or embedded s<br>ystems and the<br>large volumes | s in the<br>tks for<br>-time u<br>system<br>ir impl<br>of sen | e field of<br>real-time<br>using Python.<br>s and establish<br>ementation<br>sor data in |  |  |
|   |   | ~  |  | As  | sessmen  | it Process  |  |   |  |  |  |
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| C   | SRIBHA  | PR<br>RAT<br>EGE   | AVATHI M.E.,<br>INCIPAL<br>HI ENGINEERI<br>E FOR WOMEN<br>2 303, Pudukkotta  | NG  | ×.,  |   |  |   |  |  |  |



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#### Name of the Student :

Year/Sem:

**AU Register Number:** 

### Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications"

### MCQ QUESTIONS (20X1 = 20 Marks)

- 1. Which of the following is a key advantage of real-time sensor data processing in IoT applications?
  - a) Improved data storage for historical analysis
  - b) Reduced dependency on cloud services
  - c) Lower sensor data accuracy
  - d) Faster decision-making and response time
- 2. In real-time data processing, which Python library is commonly used for asynchronous programming?
  - a) NumPy
  - b) Pandas
  - c) Asyncio
  - d) Requests
- 3. What is the primary function of a data broker in real-time sensor data processing for IoT?
  - a) Data visualization
  - b) Data storage
  - c) Data encryption
  - d) Data routing and distribution
- 4. Which Python data structure is suitable for efficiently storing sensor data in real-time?
  - a) List
  - b) Set
  - c) Dictionary
  - d) Array
- 5. Which communication protocol is commonly used for real-time data streaming between IoT devices?
  - a) HTTP
  - b) MQTT
  - c) FTP
  - d) SMTP

6. What is the role of a "timestamp" in real-time sensor data processing?

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- a) It indicates the sensor's physical location.
- b) It specifies the type of sensor used.
- c) It helps track the time when data was collected.
- d) It encrypts the sensor data for security.
- 7. Which of the following is an example of an IoT sensor used for environmental monitoring?
  - a) Heart rate sensor
  - b) Proximity sensor
  - c) CO2 sensor
  - d) RFID sensor
- 8. In real-time sensor data processing, what does the term "latency" refer to?
  - a) Sensor accuracy
  - b) Data storage capacity
  - c) Time delay in data processing and transmission
  - d) Sensor resolution

9. Which Python library is commonly used for real-time data visualization?

- a) Matplotlib
- b) Seaborn
- c) Plotly
- d) SciPy
- 10. What is the purpose of data preprocessing in real-time sensor data processing?
  - a) To make the data available for public access
  - b) To eliminate noise and outliers from the sensor data
  - c) To physically calibrate the sensors
  - d) To encrypt the data for secure transmission
- 11. Which IoT component is responsible for transforming analog sensor data into digital format?
  - a) Actuator
  - b) Microcontroller
  - c) Gateway
  - d) Data broker
- 12. What does the term "Data Fusion" mean in the context of real-time sensor data processing?
  - a) Combining data from multiple sensors to obtain more accurate and reliable information
  - b) Encrypting the sensor data during transmission

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- c) Performing statistical analysis on sensor data
- d) Storing sensor data in a centralized database
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Dr. S. LEART CANCENTIAL M. E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.



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- a) Reducing data transmission speed
- b) Offloading data processing to local devices
- c) Storing data in a centralized cloud server
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20. In real-time sensor data processing, what does the term "data sampling rate" refer to?

- a) The time it takes to process sensor data
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Dr. S.THILAGAVATHIM.E., Ph.D.

Dr. S.THILAGAVATHURI, E., M. PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.



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Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### ACADEMIC YEAR 2022-2023/ODD SEMESTER

Value Added Course on

### Real-time Sensor Data Processing with Python for IoT Applications

| 1 | D | 6  | C | 11 | В | 16 | C |
|---|---|----|---|----|---|----|---|
| 2 | С | 7  | С | 12 | А | 17 | D |
| 3 | D | 8  | С | 13 | С | 18 | С |
| 4 | A | 9  | A | 14 | С | 19 | В |
| 5 | В | 10 | В | 15 | A | 20 | С |

#### MCQ ANSWER KEY

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Name of the Student : ABIRAMI.S

Year/Sem: ni /

AU Register Number: 912620106001

Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications"

#### MCQ QUESTIONS (20X1 = 20 Marks)

Which of the following is a key advantage of real-time sensor data processing in IoT applications?

- a) Improved data storage for historical analysis
- b) Reduced dependency on cloud services
- c) Lower sensor data accuracy
- Ar Faster decision-making and response time

2. In real-time data processing, which Python library is commonly used for asynchronous programming?

- a) NumPy
- b) Pandas
- er Asyncio
- d) Requests

hat is the primary function of a data broker in real-time sensor data processing for IoT?

- a) Data visualization
- b) Data storage
- c) Data encryption
- t) Data routing and distribution

4. Which Python data structure is suitable for efficiently storing sensor data in real-time?

an List

- b) Set
- c) Dictionary

d) Array

5. Which communication protocol is commonly used for real-time data streaming between loT devices?

- a) HTTP
- b) MQTT
- c) FTP
- d) SMTP

5. What is the role of a "timestamp" in real-time sensor data processing?

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- a) It indicates the sensor's physical location.
- b) It specifies the type of sensor used.
- of It helps track the time when data was collected.
- d) It encrypts the sensor data for security.

7. Which of the following is an example of an IoT sensor used for environmental monitoring?

- a) Heart rate sensor
- b) Proximity sensor
- CO2 sensor
- d) RFID sensor

%. /In real-time sensor data processing, what does the term "latency" refer to?

- a) Sensor accuracy
- b) Data storage capacity

C) Time delay in data processing and transmission

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9. Which Python library is commonly used for real-time data visualization?

- a) Matplotlib
- b) Seaborn
- c) Plotly
- d) SciPy

10. What is the purpose of data preprocessing in real-time sensor data processing?

- a) To make the data available for public access
- b) To eliminate noise and outliers from the sensor data
- •) To physically calibrate the sensors
- d) To encrypt the data for secure transmission

Mhich IoT component is responsible for transforming analog sensor data into digital format?

a) Actuator

b) Microcontroller

- c) Gateway
- d) Data broker

12. What does the term "Data Fusion" mean in the context of real-time sensor data processing?

- a Combining data from multiple sensors to obtain more accurate and reliable information
- b) Encrypting the sensor data during transmission

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Dr. S.THILAGAVATHI M.E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.



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Name of the Student : Manisha . S

Year/Sem: IV / VII

AU Register Number: 912619106006

Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications"

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Dr. S.THILAGAVATHIME.Ph.D. PRINCIPAL **SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN** Kaikkurchi - 622 303, Pudukkottai Dt.



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### DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING

#### ACADEMIC YEAR ODD SEMESTER (2022-2023)

### MARK SHEET FOR VALUE ADDED COURSE- REAL-TIME SENSOR DATA PROCESSING WITH PYTHON FOR IOT APPLICATIONS

| S.NO | REGISTER<br>NUMBER | NAME            | YEAR<br>&<br>BRANCH | Attendance<br>(A)             |                | VAC –MCQ TEST<br>(B)       |                | OVERALL<br>MARK(100)     |
|------|--------------------|-----------------|---------------------|-------------------------------|----------------|----------------------------|----------------|--------------------------|
|      |                    |                 |                     | No.of<br>Sessions<br>Attented | Marks<br>(100) | No.of<br>Correct<br>Answer | Marks<br>(100) | (50% of A +<br>50% of B) |
| 1    | 912620106001       | ABIRAMI S       | III & ECE           | 12                            | 100            | 18                         | 90             | 95                       |
| 2    | 912620106002       | ANUSHYA M       | III & ECE           | 10                            | 83             | 13                         | 65             | 74                       |
| 3    | 912620106003       | ARTHI S         | III & ECE           | 12                            | 100            | 15                         | 75             | 88                       |
| 4    | 912620106004       | JEYASRI K       | III & ECE           | 11                            | 91             | 19                         | 90             | 91                       |
| 5    | 912620106006       | SENPAGAHARINI V | III & ECE           | 10                            | 83             | 14                         | 70             | 77                       |
| 6    | 912620106007       | SONIYA P        | III & ECE           | 12                            | 100            | 19                         | 95             | 98                       |
| 7    | 912620106301       | ABITHA S        | III & ECE           | 11                            | 91             | 17                         | 85             | 88                       |
| 8    | 912620106302       | DESIKA G        | III & ECE           | 10                            | 83             | 16                         | 80             | 82                       |
| 9    | 912620106303       | SABAREESWARI S  | III & ECE           | 12                            | 100            | 15                         | 65             | 83                       |

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|------|--------------------|---------------|---------------------|-------------------------------|----------------|----------------------------|----------------|--------------------------|
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| 10   | 912619106001       | AASHIMA M     | IV & ECE            | 12                            | 100            | 19                         | 90             | 95                       |
| 11   | 912619106002       | ANANTHI P     | IV & ECE            | 10                            | 83             | 16                         | 80             | 82                       |
| 12   | 912619106004       | JAFFARNISHA R | IV & ECE            | 12                            | 100            | 16                         | 80             | 90                       |
| 13   | 912619106005       | MAHESWARI K   | IV & ECE            | 11                            | 91             | 17                         | 85             | 88                       |
| 14   | 912619106006       | MANISHA S     | IV & ECE            | 10                            | 83             | 16                         | 80             | 82                       |
| 15   | 912619106007       | MEGAVADHANA A | IV & ECE            | 12                            | 100            | 19                         | 95             | 98                       |
| 16   | 912619106008       | PRIYANGA R    | IV & ECE            | 11                            | 91             | 17                         | 85             | 88                       |
| 17   | 912619106009       | RAGAVI V      | IV & ECE            | 10                            | 83             | 16                         | 80             | 82                       |
| 18   | 912619106010       | RAJAPRABA M   | IV & ECE            | 12                            | 100            | 17                         | 85             | 93                       |
| 19   | 912619106011       | SASIKA K      | IV & ECE            | 11                            | 91             | 16                         | 80             | 86                       |



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COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303



### **CERTIFICATE OF COMPLETION**

## VALUE ADDED COURSE

This is to Certify that Mr/Ms. SABAREESWARI.S of III ECE has successfully completed Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications" organized by the Department of Electronics and Communication Engineering in association with Galwin Technology from 03.08.2022 to 09.08.2022 during the academic year 2022-2023.

**Managing Director** Galwin Technology

HoD/ECF

SBECW

Principal SBECW

Dr. S.THILAGAVATHI M.E. Ph.D., PRINCIPAL **SRI BHARATHI ENGINEERING** COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.



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This is to Certify that Mr/Ms. **MANISHA.S** of **IV ECE** has successfully completed Value Added Course on "Real-time Sensor Data Processing with Python for IoT Applications" organized by the Department of Electronics and Communication Engineering in association with Galwin Technology from 03.08.2022 to 09.08.2022 during the academic year 2022-2023.

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#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

#### ACADEMIC YEAR 2022-2023/EVEN SEMESTER

### DEPARTMENT CIRCULAR Date: 19.01.2023

Certificate Course offered by the Department of ECE will be conducted for all second, third year students on "**Recent Applications in IOT using Arduino and Raspbery PI**" in our college campus from 30.01.2023 to 03.02.2023.Certificates will be issued to the eligible participants at the end of the course.

| S.No | Name of the Course                              | Resource Person  |
|------|---|--|
| 1    | Recent Applications in<br>IOT using Arduino and | <ol> <li>Mrs.R.YOGESHWARI,<br/>HoD/ECE,<br/>Department of ECE,</li> <li>Sri Bharathi Engineering College for Women<br/>Kaikkurichi, Pudukkottai.</li> </ol>                      |
|      | Raspbery PI                                     | <ul> <li>2. Mr.C.PALANIYAPPAN,<br/>Assistant Professor/ECE,<br/>Department of ECE,</li> <li>Sri Bharathi Engineering College for Women,<br/>Kaikkurichi, Pudukkottai.</li> </ul> |

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303

Dr. S.THILAGAVATHIME. Ph.D.

PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottal Dt.

Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- II & III Year ECE Students
- Notice Board



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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR 2022-20223/EVEN SEMESTER

### Certificate course on "Recent Applications in IOT using Arduino and

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### SYLLABUS

| S.NO | TOPIC COVERED  | DURATION<br>(in hours) | DATE<br>FN/AN | RESOURCE<br>PERSON |
|------|--|------------------------|---------------|--------------------|
| 1    | Introduction to IOT, IOT Architecture and<br>Communication protocols ,Transducers,<br>Classification, Roles of sensors in IOT                  | 3                      | 30.1.2023     | Mrs.R.Yogeshwari   |
| 2    | Various types of sensors, Design of<br>sensors, sensor architecture, special<br>requirements for IOT sensors, Interfacing<br>to the Real World | 3                      | 30.1.2023     | Mr.M.Palaniyappan  |
| 3    | Introduction of Arduino and its Types,<br>Arduino Serial Monitor and Plotter   | 3                      | 31.1.2023     | Mr.M.Palaniyappan  |
| 4    | Technologies Used In IoT, Protocols<br>,Creating Classes and Libraries with<br>Arduino   | 3                      | 31.1.2023     | Mrs.R.Yogeshwari   |
| 5    | Getting started with Raspberry Pi, Booting<br>Up RPi- Operating System and Linux<br>Commands   | 3                      | 1.2.2023      | Mr.M.Palaniyappan  |
| 6    | C Language- Imbibing RPi with C  | 3                      | 1.2.2023      | Mrs.R.Yogeshwari   |
| 7    | Working with RPi using Python and<br>Sensing Data using Python, Python vs.<br>Other Languages, Applications of Python                          | 3                      | 2.2.2023      | Mrs.R.Yogeshwari   |
| 8    | Programming with Arduino, Arduino and ThingSpeak   | 3                      | 2.2.2023      | Mr.M.Palaniyappan  |
| 9    | IoT Design using Raspberry Pi  | 3                      | 3.2.2023      | Mrs.R.Yogeshwari   |
| 10   | Using Node-RED Visual Editor on Rpi  | 3                      | 3.2.2023      | Mr.M.Palaniyappan  |
|      | Total Hours  |                        | 30            |                    |

Coordinator Course

Dr. S.THILAGAVATHI ME., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

HoD/ECE

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKUTIC PUDUKKOTTAI - 622 303



### DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING ACADEMIC YEAR EVEN SEMESTER (2022-2023)

### STUDENT PARTICIPATION LIST FOR CERTIFICATE COURSE PROGRAM

#### RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI

| S.NO | REG.NO       | NAME            | YEAR &<br>BRANCH |
|------|--------------|-----------------|------------------|
| 1    | 912621106001 | AMRIN M         | II & IV          |
| 2    | 912621106002 | BHUVANESWARI C  | II & IV          |
| 3    | 912621106003 | DHANYASHREE A   | II & IV          |
| 4    | 912621106004 | KALAIVANI R     | II & IV          |
| 5    | 912621106005 | KAVIYA K        | II & IV          |
| 6    | 912621106006 | KEERTHANA V     | II & IV          |
| 7    | 912621106007 | PAVITHRA P      | II & IV          |
| 8    | 912621106008 | RAJESHWARI R    | II & IV          |
| 9    | 912621106009 | SUBALAKSHMI M   | II & IV          |
| 10   | 912621106010 | SUGUNA C        | II & IV          |
| 11   | 912621106301 | JAYAPRIYA M     | II & IV          |
| 12   | 912621106302 | KIRUBASHINI C   | II & IV          |
| 13   | 912620106001 | ABIRAMI S       | III & VI         |
| 14   | 912620106002 | ANUSHYA M       | III & VI         |
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| 21   | 912620106303 | SABAREESWARI S  | III & VI         |

**Course Coordinator** 

Dr. S.THILAGAVATHI M.E., Ph.Q., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN



### SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI-622 303 DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR EVEN SEMESTER (2022-2023)

### ATTENDANCE SHEET FOR CERTIFICATE COURSE PROGRAM- RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI

|      | REG. NO      | NAME                | VEAD               | 30.01   | .2023 | 31.01 | .2023 | 1.02. | 2023 | 2.02 | .2023 | 3.02. | 2023 | No. of<br>Sessions | Sign of<br>Student |
|------|--------------|---------------------|--------------------|---------|-------|-------|-------|-------|------|------|-------|-------|------|--------------------|--------------------|
| S.No |              | NAME                | YEAR/<br>BRANCH    | F.N     | A.N   | F.N   | A.N   | F.N   | A.N  | F.N  | A.N   | F.N   | A.N  | Attended           |                    |
| 1    | 912621106001 | AMRIN M             | II/ECE             | ^       | 1     | a     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | 9                  | Mtuji              |
| 2    | 912621106002 | BHUVANESWARI C      | II/ECE             | 1       | 1     | 1     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | 10                 | Bhave - C          |
| 3    | 912621106003 | DHANYASHREE A       | II/ECE             | a       | a     | 1     | 1     | 1     | 1    | 1    | ,     | 1     | 1    | 8                  | A. Dhy             |
| 4    | 912621106004 | KALAIVANI R         | II/ECE             | 1       | 1     | 1     | ٨     | 1     | 1    | a    | 1     | 1     | 1    | 9                  | Kalaivani.P        |
| 5    | 912621106005 | KAVIYA K            | II/ECE             | 1       | 1     | a     | a     | 1     | 1    | 1    | 1     | 1     | 1    | 8                  | K-Icaviyh          |
| 6    | 912621106006 | KEERTHANA V         | II/ECE             | 1       | 1     | 1     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | 10                 | V = Keyt           |
| 7    | 912621106007 | PAVITHRA P          | II/ECE             | 1       | 1     | /     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | lo                 | P. Bout Ence       |
| 8    | 912621106008 | RAJESHWARI R        | II/ECE             | a       | 1     | /     | 7     | 1     | 1    | 1    | 1     | 1     | 1    | 9                  | R. Rujar           |
| 9    | 912621106009 | SUBALAKSHMI M       | II/ECE             | a       | 1     | 1     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | 9                  | H. subrig.         |
| 10   | 912621106010 | SUGUNA C            | II/EÇE             | 1       | 1.    | 1     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | 10                 | C. Sugar           |
| 11   | 912621106301 | JAYAPRIYA M         | II/ECE             | 1       | 1     | 1     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | 10                 | MOR                |
| 12   | 912621106302 | KIRUBASHINUC        | II/ECE             | .1      | 1     | 1     | 1     | 1     | 1    | 1    | 1     | 1     | 1    | 10                 | Key .              |
| 13   | 912620106001 | ABIRAMI S Dr. S.THN | AW/ECE IN          | .E.,9h. | D.,   | 1     | 1     | 1     | 1    | 1    | 1     | ^     | 1.   | 10                 | sight              |
| 14   | 912620106002 | ANUSHYA M           | ATHIERE NON        |         | 1     | a     | a     | 1     | 1    | 1    | 1     | 1     | 1.   | 8                  | M. Amerika.        |
| 15   | 912620106003 |                     | 622 80 F, F. Faukk |         |       |       | 1     |       | 1    | ,    |       | ,     | ,    | In                 | 911                |

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|----|---------------|--|---------|---|---|---|---|---|----|---|---|---|----|----|------------------|
| 16 | 912620106004  | JEYASRI K  | III/ECE | 1 | 1 | 1 | 1 | 1 | 1  | 1 | 1 | 1 | 1  | 10 | K. Imf           |
| 17 | 912620106006  | SENPAGAHARINI V  | III/ECE | a | a | 1 | 1 | 1 | 1  | 1 | 1 | 1 | 1  | 8  | N. Shph.         |
| 18 | 912620106007  | SONIYA P   | III/ECE | 1 | 1 | 1 | 1 | 1 | 1  | 1 | 1 | 1 | 1. | 10 | P. Singer        |
| 19 | 912620106301  | ABITHA S   | III/ECE | 1 | 1 | , | 1 | a | 1. | 7 | 1 | 1 | 1  | 9  | Abj.s            |
| 20 | 912620106302  | DESIKA G   | III/ECE | 1 | 1 | 1 | 1 | a | a  | 1 | 1 | 1 | )  | 8  | Bopler           |
| 21 | 912620106303* | SÁBAREESWARI S   | III/ECE | 1 | 1 | 1 | 1 | 1 | 1  | 1 | 1 | 1 | 1  | 10 | S. Salhul        |
|    |               |  |         |   |   |   |   |   |    |   |   |   |    |    |                  |

Course Coordinator

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HoD/F

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303

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|  |  |   |  |  | Tamil Nadu – 62<br>tificate Co  |   |   |
|--|--|---|--|--|---|---|---|
| Title:   | Recent   | Applic  | Manager and the state of the state   |  | no and Raspbery   |   |   |
|  |  | 1 M   | rs.R.YOGES   | HWAR   | 1   |   |   |
| Resource   | Person:  | Но<br>2.М   | D/ECE<br><b>r.M.PALAN</b><br>ssistant Profes   | IAPPAN   | Ι,  |   |   |
| Date of co   | onduct fro   | m :   | 30.01.2023   | To:  | 03.02.2023  | Duration:   | 30 Hours  |
| Organize   | d Departm  | ent :   | Electronics an   | d Commi  | inication Engine  | ering   |   |
| Participar   |  | 2/3   | Semester:  | ODD  |   | tudents Regist  | ered : 21   |
| •  | and the second second  |   |  |  |   | tadento regist  |   |
| Venue:   |  |   | ,Ground Floor  |  | t the end of Cours  | Q1 1 .  |   |
| • E:<br>H<br>se  | ata from th<br>xplore var<br>ITTP, and<br>ervers.  | to inte<br>ne phy<br>ious c<br>WebS   | sical world, and<br>ommunication p<br>ocket, and imple   | ate differen<br>understan<br>protocols co<br>ement then  | nt sensors with And<br>d data acquisition<br>ommonly used in<br>n to establish data   | rduino and Ras<br>techniques.<br>IoT applicatio<br>exchange bet                                   | spberry Pi, collect<br>ons, such as MQTT,<br>ween devices and                                 |
| da<br>• E:<br>• H<br>se<br>• U<br>se<br>• D<br>er<br>• N | ata from the<br>xplore var<br>(TTP, and<br>ervers.<br>Inderstand<br>ecuring Io<br>Develop tro<br>ncounterect<br>Io. of stude | to inte<br>ne phy<br>ious c<br>WebS<br>the in<br>Γ devi<br>bubles<br>I durir<br>ents su | rface and integra<br>sical world, and<br>ommunication p<br>ocket, and imple<br>portance of IoT<br>ces, data, and co<br>nooting and deb<br>ig IoT application | ate differen<br>understan<br>protocols co<br>ement then<br>' security a<br>ommunicat<br>ugging ski<br>on develop                 | nt sensors with And<br>d data acquisition<br>ommonly used in<br>n to establish data<br>and privacy conce<br>ion channels.<br>Ils to identify and          | rduino and Ras<br>techniques.<br>IoT applicatio<br>exchange bet<br>rns, exploring<br>resolve comm | spberry Pi, collect<br>ons, such as MQTT,<br>ween devices and<br>strategies for<br>non issues |
| da<br>• E:<br>• H<br>se<br>• U<br>se<br>• D<br>er<br>• N | ata from the<br>xplore var<br>(TTP, and<br>ervers.<br>Inderstand<br>ecuring Io<br>Develop tro<br>ncounterect<br>Io. of stude | to inte<br>ne phy<br>ious c<br>WebS<br>the in<br>Γ devi<br>bubles<br>I durir<br>ents su | rface and integra<br>sical world, and<br>ommunication p<br>ocket, and imple<br>portance of IoT<br>ces, data, and co<br>nooting and debu<br>ng IoT applicatio | ate differen<br>understam<br>protocols co<br>ement then<br>' security a<br>ommunicat<br>ugging ski<br>on develop<br>oleted the c | nt sensors with And<br>d data acquisition<br>ommonly used in<br>n to establish data<br>and privacy conce<br>ion channels.<br>Ils to identify and<br>ment. | rduino and Ras<br>techniques.<br>IoT applicatio<br>exchange bet<br>rns, exploring<br>resolve comm | spberry Pi, collect<br>ons, such as MQTT,<br>ween devices and<br>strategies for<br>non issues |



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### Name of the Student :

### Year/Sem: II &III/IV&VI

#### **AU Register Number:**

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi"

#### MCQ QUESTIONS (25X1 = 25 Marks)

| 1. The Raspberry Pi is defined as the  | en die staat weerste bestehende die die staat verbeel. |
|--|--|
| a) Micro Computer                      | c) Mini computer                                       |
| b) Mega Computer                       | d) Nano Computer                                       |
| 2. Raspbian is                         |  |
| a) Assembler                           | c) Compiler  |
| b) Language                            | d) OS  |
| 3. Raspberry Pi consists of a          | _ quad-core processor or microprocessor.               |
| a) 16-bit                              | c) 64-bit  |
| b) 32-bit                              | d) 128-bit   |
| 4. The Raspberry Pi has a              | interface to allow it to perform serial data           |
| communications.                        | Tradiel of a residence of a residence of a             |
| a) UART                                | c) I2C   |
| b) GPIO                                | d) SPI   |
| 5. How many USB ports are present      | in Raspberry Pi 3?                                     |
| a) 5                                   | c) 4 devloceday Side                                   |
| b) 2                                   | d) 3   |
| 6. What bit processor is used in Pi 3? | ni energen gestimulien vir begangebelen odt over b     |
| a) 64-bit                              | c) 128-bit   |
| b) 32-bit                              | d) Both 64 and 32 bit                                  |
| 7. What is the speed of operation in F | Pi 3?  |
| a) 900MHz                              | c) 1GHz  |
| b) 1.2GHz                              | d) 500MHz  |
| 8. What is the Ethernet/LAN cable us   | sed in RPi?  |
| a) Cat5                                | c) Cat6  |
| b) Cat5e                               | d) RJ45/   |
|  |  |
|  | C XL-D   |
|  |  |



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| <ul><li>9. How many Input/Output pins on board Raspberry Pi3</li><li>a) 20</li><li>b) 30</li></ul>                                   | c) 40<br>d) 50                                      |
|--|---|
| <ul><li>10. How much RAM, the Raspberry Pi has?</li><li>a) 2GiB of RAM</li><li>b) 1GiB of RAM</li></ul>                              | c) 4GiB of RAM<br>d) 8GiB of RAM                    |
| <ul><li>11. What is the maximum peripheral current draw allowe</li><li>a) 1200 mA</li><li>b) 700 mA</li></ul>                        | ed in Raspberry Pi 3?<br>c) 500 mA<br>d) 100 mA     |
| <ul><li>12. Does micro SD card present in all modules?</li><li>a) True</li></ul>   | b) False  |
| <ul><li>13. Does Raspberry Pi need external hardware?</li><li>a) True</li></ul>  | b) False  |
| <ul><li>14. Does RPi have an internal memory?</li><li>a) True</li></ul>  | b) False  |
| <ul><li>15. Which operating system Raspberry Pi has?</li><li>a)Linux</li><li>b) OpenBSD</li></ul>                                    | c) NetBSD<br>d) All of the above                    |
| <ul><li>16. How power supply is done to RPi?</li><li>a) USB connection</li><li>b) Internal battery</li></ul>                         | c) Charger<br>d) Adapter                            |
| 17. What are the mode(s) used for addressing the pins in   | Raspberry Pi?                                       |
| a) GPI<br>b) BCM   | c) BOARD & BCM<br>d) GPIO, BCIM & CAN               |
| <ul><li>18. What are the parameters that are default values?</li><li>a) Port_Name and Bits</li><li>b) Speed and Port_Names</li></ul> | c) Speed and Parity<br>d) Stop bit and Flow Control |
| <ul> <li>19. The BCM 14 pin of Raspberry Pi is</li> <li>a) Physical pin 8</li> <li>b) UART</li> </ul>                                | c) Transmitter pin<br>d) All of the above           |

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- 20. What is the command used for easy using of GNU screen?
  - a) \$useradd -G {dialout} your\_nameb) Screen Port Name115200

c) Minicom -b 115200 -o -D d) Prompt> # help

- 21.GPIO stand for General Purpose Input Output Pins a) True b) False
- 22. Which instruction set architecture is used in Raspberry Pi?
  a) X86
  b) MSP
  c) AVR
  d) ARM
- 23. Which instruction set is used in Raspberry Pi?
  a) CISC
  b) RISC
  c) MIPS
  d) None of these mentioned
- 24. Which of the following variants of Raspberry Pi has an inbuilt wi-fi?
  a) Raspberry Pi 2
  b) Raspberry Pi 3
  c) Raspberry Pi A+
  d) Raspberry Pi Zero
- 25. Which of the following is not a types of Raspberry Pi?
  a) Raspberry Pi Alternatives
  b) Raspberry Pi Zero W
  c) Raspberry Pi 3 Model B+
  d) Raspberry Pi 3 Model A+



### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR 2022-2023/EVEN SEMESTER

#### Certificate Course on Recent Applications in IoT Using Ardunio and Raspbery Pi

| 1 | C | 6   | A | 11 | А | 16 | А | 21 | A |
|---|---|-----|---|----|---|----|---|----|---|
| 2 | D | 7   | В | 12 | A | 17 | С | 22 | D |
| 3 | C | - 8 | D | 13 | В | 18 | В | 23 | С |
| 4 | A | 9   | С | 14 | A | 19 | D | 24 | В |
| 5 | С | 10  | В | 15 | D | 20 | В | 25 | D |

#### MCQ ANSWER KEY



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Name of the Student : R. kalaireani

## Year/Sem: II &III/IV&VI

### AU Register Number: 912621106004

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi"

|   | S(25X1 = 25  Marks)                              |
|---|--|
| . The Raspberry Pi is defined as the          |  |
| a) Micro Computer                             | © Mini computer                                  |
| b) Mega Computer                              | d) Nano Computer                                 |
| . Raspbian is                                 | saleboar be in insering may obe or sum establish |
| a) Assembler                                  | <u>c</u> ) Compiler                              |
| b) Language                                   | d os   |
| . Raspberry Pi consists of a quad-core        | e processor or microprocessor.                   |
| a) 16-bit                                     | c) 64-bit  |
| b) 32-bit                                     | d) 128-bit                                       |
| 9.52.01                                       | dy 120 on  |
| . The Raspberry Pi has a interface            | to allow it to perform serial data               |
| ommunications.                                | Seem of A nondepting is Supplied of Rouges of    |
| a) UART                                       | c) I2C   |
| Ъ) GPIO                                       | d) SPI   |
| . How many USB ports are present in Raspberr  | rv Pi 32   |
| a) 5  | ©14  |
| b) 2  | d) 3   |
|   | 0,5  |
| . What bit processor is used in Pi 3?         |  |
| a) 64-bit                                     | c) 128-bit                                       |
| b) 32-bit                                     | d) Both 64 and 32 bit                            |
| . What is the speed of operation in Pi 3?     |  |
| a) 900MHz                                     | c) 1GHz  |
| (b) 1.2GHz                                    | d) 500MHz  |
|   | d) sound   |
| . What is the Ethernet/LAN cable used in RPi? |  |
|   | c) Cat6  |
| a Cat5  |  |
|   | (d) RJ45   |
| a Cat5  | (d) RJ45   |
| a Cat5  | (d) RJ45   |

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| 9. How many Input/Output pins on board   | Raspberry Pi3 has?                 |
|--|------------------------------------|
| a) 20                                    | C 40                               |
| b) 30                                    | ST 50                              |
| 10. How much RAM, the Raspberry Pi ha    | s?                                 |
| a) 2GiB of RAM                           | c) 4GiB of RAM                     |
| (b) 1GiB of RAM                          | d) QCID of DAM                     |
| 11. What is the maximum peripheral curre | nt draw allowed in Raspberry Pi 3? |
| (a) 1200 mA                              | c) 500 mA                          |
| b) 700 mA                                | d) 100 mA                          |
| 2. Does micro SD card present in all moc | lules?                             |
| (a) True                                 | b) False                           |

- 🔀 13. Does Raspberry Pi need external hardware? (a) True
  - 14. Does RPi have an internal memory? (a) True
  - 15. Which operating system Raspberry Pi has? a)Linux b) OpenBSD
  - 16. How power supply is done to RPi? (a) USB connection b) Internal battery

17. What are the mode(s) used for addressing the pins in Raspberry Pi? a) GPI b) BCM

- 18. What are the parameters that are default values? (a) Port Name and Bits b) Speed and Port Names
- 19. The BCM 14 pin of Raspberry Pi is a) Physical pin 8 b) UART

of RAM ofRAM

b) False

b) False

c) NetBSD d) All of the above

c) Charger d) Adapter

(c) BOARD & BCM d) GPIO, BCIM & CAN

c) Speed and Parity d) Stop bit and Flow Control

c) Transmitter pin (d) All of the above Dr. S.THILAGAVATHI M.E., Ph.D., PRINCIPAL

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20. What is the command used for easy using of GNU screen?

a) \$useradd -G {dialout} your\_name (b)Screen Port\_Name115200 c) Minicom -b 115200 -o -D d) Prompt> # help

b) False

21.GPIO stand for General Purpose Input Output Pins

22. Which instruction set architecture is used in Raspberry Pi?
 a) X86
 b) MSP
 c) AVR
 d) ARM

23. Which instruction set is used in Raspberry Pi?
a) CISC
b) RISC

c) MIPSd) None of these mentioned

24. Which of the following variants of Raspberry Pi has an inbuilt wi-fi?a) Raspberry Pi 2b) Raspberry Pi 3c) Raspberry Pi Zero

25. Which of the following is not a types of Raspberry Pi?
a) Raspberry Pi Alternatives
b) Raspberry Pi Zero W

c) Raspberry Pi 3 Model B+ (d) Raspberry Pi 3 Model A+

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Name of the Student : P. Soniga

Year/Sem: II &III/IV&VI

AU Register Number: 912620166007

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi "

#### MCQ QUESTIONS (25X1 = 25 Marks)

1. The Raspberry Pi is defined as the \_\_\_\_\_\_
a) Micro Computer
b) Mega Computer

C Mini computer d) Nano Computer

 Raspbian is \_ a) Assembler
 b) Language

c) Compiler d) OS

c) I2C

d) SPI

(c)4

d) 3

c) 128-bit

c) 1GHz

d) 500MHz

d) Both 64 and 32 bit

3. Raspberry Pi consists of a \_\_\_\_\_ quad-core processor or microprocessor. a) 16-bit b) 32-bit d) 128-bit

4. The Raspberry Pi has a \_\_\_\_\_\_ interface to allow it to perform serial data communications.

a) UART

5. How many USB ports are present in Raspberry Pi 3?a) 5b) 2

6. What bit processor is used in Pi 3?
 (a) 64-bit
 (b) 32-bit

7. What is the speed of operation in Pi 3?
a) 900MHz
b) 1.2GHz

8. What is the Ethernet/LAN cable used in RPi?a) Cat5b) Cat5e

c) Cat6 d) RJ45



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| 9. How many Input/Output pins on board Raspberry P   |                         |
|--|-------------------------|
| a) 20  | <b>(0</b> ) 40          |
| b) 30  | d) 50                   |
| 10. How much RAM, the Raspberry Pi has?              |                         |
| a) 2GiB of RAM                                       | c) 4GiB of RAM          |
| b IGiB of RAM  | d) 8GiB of RAM          |
| 11. What is the maximum peripheral current draw allo | owed in Raspberry Pi 3? |
| (a) 1200 mA  | c) 500 mA               |
| b) 700 mA  | d) 100 mA               |
| 12. Does micro SD card present in all modules?       |                         |
| (a) True   | b) False                |
|  |                         |
| 13. Does Raspberry Pi need external hardware?        |                         |
| a) True  | <b>b</b> False          |
| 14. Does RPi have an internal memory?                |                         |
| (a) True   | b) False                |
| 15. Which operating system Raspberry Pi has?         |                         |
| a)Linux  | c) NetBSD               |
| b) OpenBSD   | (d) All of the above    |
| 16. How power supply is done to RPi?                 |                         |
| a) USB connection                                    | c) Charger              |
| b) Internal battery                                  | (d)Adapter              |
|  |                         |

7. What are the mode(s) used for addressing the pins in Raspberry Pi? a) GPI b) BCM a) GPI c) BOARD & BCM d) GPIO, BCIM & CAN

18. What are the parameters that are default values?
a) Port\_Name and Bits
b) Speed and Port\_Names

19. The BCM 14 pin of Raspberry Pi isa) Physical pin 8b) UART

c) Speed and Parityd) Stop bit and Flow Control

c) Transmitter pin d) All of the above



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20. What is the command used for easy using of GNU screen? a) \$useradd -G {dialout} your name c) Minicom -b 115200 -o -D b)Screen Port Name115200 d) Prompt> # help 21.GPIO stand for General Purpose Input Output Pins a) True b) False 22. Which instruction set architecture is used in Raspberry Pi? a) X86 c) AVR b) MSP d) ARM 23. Which instruction set is used in Raspberry Pi? a) CISC c) MIPS b) RISC d) None of these mentioned 24. Which of the following variants of Raspberry Pi has an inbuilt wi-fi? a) Raspberry Pi 2

b) Raspberry Pi 3

C Raspberry Pi A+ d) Raspberry Pi Zero

25. Which of the following is not a types of Raspberry Pi?
a) Raspberry Pi Alternatives
b) Raspberry Pi Zero W
c) Raspberry Pi 3 Model B+
d) Raspberry Pi 3 Model A+

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### DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING

### ACADEMIC YEAR EVEN SEMESTER (2022-2023)

### MARK SHEET FOR CERTIFICATE COURSE- RECENT APPLICATIONS IN IOT USING ARDUINO

### AND RASPBERY PI

| S.NO | DECISTED           |                | YEAR        | Atten<br>(A                   | dance<br>A)    | VAC -MC<br>(E              | OVERALL<br>MARK(100) |                          |
|------|--------------------|----------------|-------------|-------------------------------|----------------|----------------------------|----------------------|--------------------------|
|      | REGISTER<br>NUMBER | NAME           | &<br>BRANCH | No.of<br>Sessions<br>Attented | Marks<br>(100) | No.of<br>Correct<br>Answer | Marks<br>(100)       | (50% of A +<br>50% of B) |
| 1    | 912621106001       | AMRIN M        | II /ECE     | 9                             | 90             | 22                         | 88                   | 89                       |
| 2    | 912621106002       | BHUVANESWARI C | II /ECE     | 10                            | 100            | 23                         | 92                   | 96                       |
| 3    | 912621106003       | DHANYASHREE A  | II /ECE     | 8                             | 80             | 21                         | 84                   | 82                       |
| 4    | 912621106004       | KALAIVANI R    | II /ECE     | 9                             | 90             | 20                         | 80                   | 85                       |
| 5    | 912621106005       | KAVIYA K       | II /ECE     | 8                             | 80             | 19                         | 76                   | 78                       |
| 6    | 912621106006       | KEERTHANA V    | II /ECE     | 10                            | 100            | 20                         | 80                   | 90                       |
| 7    | 912621106007       | PAVITHRA P     | II /ECE     | 10                            | 100            | 21                         | 84                   | 92                       |
| 8    | 912621106008       | RAJESHWARI R   | II /ECE     | 9                             | 90             | 19                         | 76                   | 83                       |
| 9    | 912621106009       | SUBALAKSHMI M  | II /ECE     | 9                             | 90             | 18                         | 72                   | 81                       |
| 10   | 912621106010       | SUGUNA C       | II /ECE     | 10                            | 100            | 22                         | 88                   | 94                       |

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| 11 | 912621106301 | JAYAPRIYA M     | II /ECE   | 10 | 100 | 20 | 80 | 90 |
|----|--------------|-----------------|-----------|----|-----|----|----|----|
| 12 | 912621106302 | KIRUBASHINI C   | II /ECE   | 10 | 100 | 19 | 76 | 88 |
| 13 | 912620106001 | ABIRAMI S       | III / ECE | 10 | 100 | 18 | 72 | 86 |
| 14 | 912620106002 | ANUSHYA M       | III / ECE | 8  | 80  | 20 | 80 | 80 |
| 15 | 912620106003 | ARTHI S         | III / ECE | 10 | 100 | 20 | 80 | 90 |
| 16 | 912620106004 | JEYASRI K       | III / ECE | 10 | 100 | 18 | 72 | 86 |
| 17 | 912620106006 | SENPAGAHARINI V | III / ECE | 8  | 80  | 19 | 76 | 78 |
| 18 | 912620106007 | SONIYA P        | III / ECE | 10 | 100 | 22 | 88 | 94 |
| 19 | 912620106301 | ABITHA S        | III / ECE | 9  | 90  | 19 | 76 | 83 |
| 20 | 912620106302 | DESIKA G        | III / ECE | 8  | 80  | 18 | 72 | 76 |
| 21 | 912620106303 | SABAREESWARI S  | III / ECE | 10 | 100 | 19 | 76 | 88 |

Rugh Course Coordinator

Dr. S.THILAGAVATHIML....) PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai DJ,

HoD/ ECE

HOD / ECE SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN (Approved by AICTE, Affiliated to Anna University) KAIKKURICHI, PUDUKKOTTAI-622303

### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### **CERTIFICATE OF PARTICIPATION**

This is to Certify that Mr/Ms. **RAJESHWARI R** (Reg.No: 912621106008), II ECE has successfully completed Certificate Course on "<u>Recent Applications in 10T using</u> <u>Arduino and Raspberg PI</u>" held at our college campus from 30.01.2023 to 03.02.2023

U.S.THI

for the academic year 2022-2023 [5 Days].

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EGE FOR WOMEN

PRINCIPAL SRI BHARATHI ENGINEERING

Kaikkurchi - 622 303, Pudukkottai Dt.

PRINCIPAL

7.00 **COURSE COORDINATOR** 



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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### **CERTIFICATE OF PARTICIPATION**

This is to Certify that Mr/Ms. ABITHA S (Reg.No: 912620106301), III ECE has successfully completed Certificate Course on "Recent Applications in 10T using

Arduíno and Raspbery PI " held at our college campus from 30.01.2023 to 03.02.2023

for the academic year 2022-2023 [5 Days].

**COURSE COORDINATOR** 

Dr. S.THILAG

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

PRINCIPAL



#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

#### ACADEMIC YEAR 2022-2023/EVEN SEMESTER

### DEPARTMENT CIRCULAR Date: 01.02.2023

Certificate Course offered by the Department of ECE will be conducted for Final year students on "**Recent Applications in IOT using Arduino and Raspbery PI**" in our college campus. The Classes will be held as per the schedule mentioned in the class time table. Certificates will be issued to the eligible participants at the end of the course.

| S.No | Name of the Course   | Resource Person  |
|------|--|--|
| 1    | Recent Applications in<br>IOT using Arduino and<br>Raspbery PI | Mr.M.PALANIYAPPAN,<br>Assistant Professor/ECE,<br>Department of ECE,<br>Sri Bharathi Engineering College for Women,<br>Kaikkurichi, Pudukkottai. |

HOD / ECE SRI BHARATHI ENGINEERIN COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303

Cc:

- Principal's Office
- IQAC Coordinator
- Class In charges- II ,III &IV Year
- IV Year ECE Students
- Notice Board

Dr. S.THILAGAVATHI HE., Ph.D.,

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR 2022-20223/EVEN SEMESTER

### Certificate course on "Recent Applications in IOT using Arduino and

### **Raspbery PI**"

#### **SYLLABUS**

| S.NO | TOPIC COVERED   | DURATION<br>(in hours) | DATE<br>FN/AN | RESOURCE<br>PERSON |
|------|---|------------------------|---------------|--------------------|
| 1    | Introduction to IOT, IOT Architecture and<br>Communication protocols ,Transducers,<br>Classification, Roles of sensors in IOT               | 3                      | 9.2.2023      | Mr.M.Palaniyappar  |
| 2    | Various types of sensors, Design of sensors,<br>sensor architecture, special requirements for<br>IOT sensors, Interfacing to the Real World | 3                      | 16.2.2023     | Mr.M.Palaniyappar  |
| 3    | Introduction of Arduino and its Types,<br>Arduino Serial Monitor and Plotter  | 3 23.2.2023            |               | Mr.M.Palaniyappar  |
| 4    | Technologies Used In IoT, Protocols<br>,Creating Classes and Libraries with<br>Arduino  | 3                      | 2.3.2023      | Mr.M.Palaniyappar  |
| 5    | Getting started with Raspberry Pi, Booting<br>Up RPi- Operating System and Linux<br>Commands  | 3                      | 9.3.2023      | Mr.M.Palaniyappa   |
| 6    | C Language- Imbibing RPi with C   | 3                      | 16.3.2023     | Mr.M.Palaniyappa   |
| 7    | Working with RPi using Python and Sensing<br>Data using Python, Python vs. Other<br>Languages, Applications of Python                       | 3                      | 23.3.2023     | Mr.M.Palaniyappa   |
| 8    | Programming with Arduino, Arduino and ThingSpeak  | 3                      | 30.3.2023     | Mr.M.Palaniyappar  |
| 9    | IoT Design using Raspberry Pi   | 3                      | 6.4.2023      | Mr.M.Palaniyappar  |
| 10   | Using Node-RED Visual Editor on Rpi   | 3                      | 13.4.2023     | Mr.M.Palaniyappa   |
| 11   | IoT-based Health and Wellness<br>Applications.  | 3                      | 20.4.2023     | Mr.M.Palaniyappar  |
| 12   | Implementing data analytics on collected<br>IoT data.   | 3.                     | 27.4.2023     | Mr.M.Palaniyappar  |
|      | Total Hours   |                        | 36            |                    |

Course-Coordinator

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### DEPARTMENT OF ELECTRONICS AN COMMUNICATIONENGINEERING

### ACADEMIC YEAR EVEN SEMESTER (2022-2023)

### STUDENT PARTICIPATION LIST FOR CERTIFICATE COURSE PROGRAM

### **RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI**

| S.NO | REG.NO       | NAME          | YEAR &<br>BRANCH |
|------|--------------|---------------|------------------|
| 1    | 912619106001 | AASHIMA M     | IV& ECE          |
| 2    | 912619106002 | ANANTHI P     | IV& ECE          |
| 3    | 912619106004 | JAFFARNISHA R | IV& ECE          |
| 4    | 912619106005 | MAHESWARI K   | IV& ECE          |
| 5    | 912619106006 | MANISHA S     | IV& ECE          |
| 6    | 912619106007 | MEGAVADHANA A | IV& ECE          |
| 7    | 912619106008 | PRIYANGA R    | IV& ECE          |
| 8    | 912619106009 | RAGAVI V      | IV& ECE          |
| 9    | 912619106010 | RAJAPRABA M   | IV& ECE          |
| 10   | 912619106011 | SASIKA K      | IV& ECE          |

**Course** Coordinator

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### ATTENDANCE SHEET FOR CERTIFICATE COURSE PROGRAM- RECENT APPLICATIONS IN IOT USING ARDUINO AND RASPBERY PI

| S.N<br>O | REG. NO      | NAME          | YEAR/<br>BRANCH | 2/2/2023<br>AN | 9/2/2023<br>AN | 16/2/2023<br>AN | 23/2/2023<br>AN | 2/3/2023<br>AN | 9/3/2023<br>AN | 16/3/2023<br>AN | 23/3/2023<br>AN | 30/3/2023<br>AN | 6/4/2023<br>AN | 13/4/2023<br>AN | 20/4/2023<br>AN | No. of<br>Sessions<br>Attended | Sign of<br>Student |
|----------|--------------|---------------|-----------------|----------------|----------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|--------------------------------|--------------------|
| 1        | 912619106001 | AASHIMA M     | IV/ECE          | a              | a              | 1               | 1               | 1              | 1              | 1               | 1               | 1               | 1              | 1               | ,               | 10                             | Anos               |
| 2        | 912619106002 | ANANTHI P     | IV/ECE          | 1              | 1              | 1               | 1               | 1              | 1              | 1               | 1               | 1               | ,              | à               | 1               | 11                             | Ddit               |
| 3        | 912619106004 | JAFFARNISHA R | IV/ECE          | 1              | 1              | 1               | 1               | 1              | a              | a               | ,               | 1               | ,              | 1               | 1               | 10                             | A Sut              |
| 4        | 912619106005 | MAHESWARI K   | IV/ECE          | 1              | 1              | 1               | 1               | 1              | ,              | 1               | ,               | 1               | 1              | 1               | 1               | 12                             | Mahij              |
| 5        | 912619106006 | MANISHA S     | IV/ECE          | 1              | 1              | a               | a               | 1              | ,              | 1               | 1               | 1               | 1              | 1               | 1               | 10                             | S. Noj             |
| 6        | 912619106007 | MEGAVADHANA A | IV/ECE          | a              | 1              | 1               | 1               | 1              | ,              | /               | a               | a               | ,              | 1               | 1               | 9                              | Arong              |
| 7        | 912619106008 | PRIYANGA R    | IV/ECE          | 1              | 1              | 1               | 1               | 1              | 1              | 1               | 1               | 1               | ,              | a               | 1               | 11                             | RR                 |
| 8        | 912619106009 | RAGAVI V      | IV/ECE          | 1              | 1              | 1               | 1               | 1              | 1              | 1               | a               | 1               | 1              | 1               | 1               | 11                             | KNE                |
| 9        | 912619106010 | RAJAPRABA M   | IV/ECE          | 1              | 1              | 1               | 1               | 1              | 1              | 1               | 1               | 1               | 1              | 1               | 1               | 12                             | &d                 |
| 10       | 912619106011 | SASIKA K      | IV/ECE          | 1              | 1              | a               | a               | 1              | 1              | 1               | 1               | 1               | 1              | 1               | 1               | 10                             | B. Sof             |

Course Coordinator

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Kygh HoD/ ÉCE

HOD / L ... SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI,

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### **Report on Certificate Course**

Title: Recent Applications in IOT using Arduino and Raspbery PI Mr.M.PALANIAPPAN, **Resource Person:** Assistant Professor/ECE Date of conduct from : 02.02.2023 To: 12.05.2023 Duration: **30 Hours** Organized Department : **Electronics and Communication Engineering** Participant Year: 4 Semester: ODD No. of Students Registered : 10 Venue: Seminar Hall, .Ground Floor, SBECW Outcome of Certificate Course (CC) :At the end of Course .Students can able to Understand the basic concepts and principles of the Internet of Things (IoT), including the role of sensors, actuators, communication protocols, data processing, and cloud integration. • Learn how to interface and integrate different sensors with Arduino and Raspberry Pi, collect data from the physical world, and understand data acquisition techniques. Explore various communication protocols commonly used in IoT applications, such as MOTT, • HTTP, and WebSocket, and implement them to establish data exchange between devices and servers. Understand the importance of IoT security and privacy concerns, exploring strategies for securing IoT devices, data, and communication channels. Develop troubleshooting and debugging skills to identify and resolve common issues encountered during IoT application development. No. of students successfully completed the certificate course is 10 Students based on the following Assessment process. Assessment Process • Students securing more than 60% on total score and secured more than 75% in attendance is eligible to receive the certificate for the Certificate course conducted • Total Score = (0.5 \*Attendance in CC out of 100 percentage + 0.5 \*Test mark in CC out of 100 marks) Course Coordinator Principal HOD / ECE SRI BHARATHI ENGINEERING PRINCIPAL COLLEGE FOR WOMEN SRI BHARATHI ENGINEERING KAIKKURICHI. COLLEGE FOR WOMEN PUDUKKOTTAI - 622 303 KAIKKURICHI - 622 303. PUDUKKOTTAI DISTRICT

Dr. S.THILAGAVATHIM.E., Ph.D., SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.



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### Name of the Student :

#### Year/Sem:IV/VIII

#### **AU Register Number:**

### Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi "

#### MCQ QUESTIONS (25X1 = 25 Marks)

- Which of the following is a popular microcontroller board commonly used in IoT projects?
  - a) Raspberry Pi
  - b) b) Arduino
  - c) c) BeagleBone
  - d) d) NVIDIA Jetson
- 2. What is the primary function of the Arduino in IoT applications?
  - a) Handling complex computations
  - b) Data visualization
  - c) Sensor data processing
  - d) Cloud-based data storage
- 3. Which programming language is commonly used to program Arduino boards for IoT applications?
  - a) Java
  - b) C++
  - c) Python
  - d) JavaScript
- 4. What is the role of Raspberry Pi in IoT projects?
  - a) Real-time sensor data processing
  - b) Wireless communication between devices
  - c) Cloud-based data analytics
  - d) Edge computing and data aggregation



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- 5. Which of the following wireless communication protocols is commonly used in IoT projects with Arduino and Raspberry Pi?
  - a) Bluetooth
  - b) Zigbee
  - c) Wi-Fi
  - d) All of the above
- 6. Which board is well-suited for power-constrained IoT applications due to its low energy consumption?

a) Arduino Uno

- b) Raspberry Pi 3 Model B+
- c) Arduino Nano
- d) Raspberry Pi 4 Model
- 7. What is the significance of GPIO (General Purpose Input Output) pins on both Arduino and Raspberry Pi boards?
  - a) They provide power to the board.
  - b) They enable communication with external devices and sensors.
  - c) They store the boot configuration of the board.
  - d) They allow access to the internet
- 8. Which of the following is an example of an IoT application using Arduino and Raspberry Pi?
  - a) Facial recognition system
  - b) Autonomous car
  - c) Smart home automation
  - d) Online shopping platform
- 9. Which board has more computational power, enabling it to handle more complex tasks like running web servers or databases?

a) Arduino

- b) Raspberry Pi
- c) Both have similar computational power
- d) None of the above

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- 10. Which board is more suitable for real-time data processing directly at the source of data collection?
  - a) Arduino
  - b) Raspberry Pi
  - c) Both are equally suitable
  - d) It depends on the specific application requirements
- 11. What is the primary benefit of using MQTT (Message Queuing Telemetry Transport) in IoT applications with Arduino and Raspberry Pi?
  - a) Real-time video streaming
  - b) Secure data storage
  - c) Low latency communication
  - d) Scalability for handling large datasets
- 12. Which of the following is NOT a sensor commonly used with Arduino and Raspberry Pi in IoT projects?
  - a) Temperature sensor b) Motion sensor c) Camera sensor d) RFID sensor
- 13. What does the term "IoT gateway" refer to in the context of Arduino and Raspberry Pi applications?
  - a) A physical entrance to an IoT network
  - b) A device that bridges communication between IoT devices and the cloud
  - c) A secure connection protocol for IoT devices
  - d) A platform for developing IoT applications
- 14. Which programming language is commonly used for Raspberry Pi development in IoT projects?
  - a) C#
  - b) Python
  - c) Java
  - d) Ruby
- 15. Which board is typically used for battery-powered IoT applications due to its energy efficiency?
  - a) Raspberry Pi Zero
  - b) Raspberry Pi 4 Model B



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- c) Arduino Mega 2560
- d) Arduino Uno
- 16. Which of the following communication protocols is commonly used for short-range communication between IoT devices in a home automation scenario?
  - a) Wi-Fi
  - b) b) Bluetooth
  - c) c) LoRaWAN
  - d) d) 5G
- 17. In IoT applications with Arduino and Raspberry Pi, what is MQTT used for?
  - a) Data storage
  - b) Sensor calibration
  - c) Real-time communication between devices
  - d) Machine learning model training
- 18. What is the primary role of a sensor node in an IoT network?
  - a) Data visualization
  - b) Data analysis
  - c) Data storage
  - d) Sensing and collecting data from the environment
- 19. Which of the following is an example of a recent IoT application that combines Arduino and Raspberry Pi technology?

a) Autonomous drone delivery b) Virtual reality gaming

- c) Satellite communication d) Online banking
- 20. Which board provides a more suitable platform for prototyping and experimentation in IoT projects?
  - a) Raspberry Pi
  - b) Arduino
  - c) Both are equally suitable
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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING ACADEMIC YEAR 2022-2023/EVEN SEMESTER

Certificate Course on Recent Applications in IoT using Ardunio and Raspbery Pi

| 1 | В | 6  | С | 11 | С | 16 | В |
|---|---|----|---|----|---|----|---|
| 2 | С | 7  | В | 12 | С | 17 | C |
| 3 | В | 8  | С | 13 | В | 18 | D |
| 4 | D | 9  | В | 14 | В | 19 | A |
| 5 | D | 10 | А | 15 | A | 20 | С |

#### MCQ ANSWER KEY

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# Name of the Student : Raja praba. M

Year/Sem:IV/VIII

AU Register Number: 9126 19106010

Certificate Course on "Recent Applications in IoT using Ardunio and Raspbery Pi "

### MCQ QUESTIONS (25X1 = 25 Marks)

Which of the following is a popular microcontroller board commonly used in IoT projects?

a) Raspberry Pi

b) Arduino

c) c) BeagleBone

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2. What is the primary function of the Arduino in IoT applications?

a) Handling complex computations

b) Data visualization

c) Sensor data processing

d) Cloud-based data storage

. Which programming language is commonly used to program Arduino boards for IoT applications?

a) Java

(b) C++

c) Python

d) JavaScript

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a) Real-time sensor data processing

b) Wireless communication between devices

- c) Cloud-based data analytics
- d) Edge computing and data aggregation



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- C Low latency communication
- d) Scalability for handling large datasets

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  - a) A physical entrance to an IoT network
  - b) A device that bridges communication between IoT devices and the cloud
  - c) A secure connection protocol for IoT devices
  - d) A platform for developing IoT applications

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- c) Java
- d) Ruby

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- c) Arduino Mega 2560
- d) Arduino Uno

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- a) Wi-Fi
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- c) c) LoRaWAN
- d) d) 5G

17. In IoT applications with Arduino and Raspberry Pi, what is MQTT used for?

a) Data storage

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c) Real-time communication between devices

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- b) Data analysis
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a) Autonomous drone delivery b) Virtual reality gaming

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20. Which board provides a more suitable platform for prototyping and experimentation in

- JoT projects?
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b) Arduino

c) Both are equally suitable

d) None of the above



### DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING ACADEMIC YEAR EVEN SEMESTER (2022-2023)

### MARK SHEET FOR CERTIFICATE COURSE- RECENT APPLICATIONS IN IOT USING ARDUINOAND RASPBERY PI

| S.NO | REGISTER     |               | YEAR        | Atten<br>(A                   |                | VAC -MC                    | OVERALL<br>MARK(100) |                          |
|------|--------------|---------------|-------------|-------------------------------|----------------|----------------------------|----------------------|--------------------------|
|      | NUMBER       | NAME          | &<br>BRANCH | No.of<br>Sessions<br>Attented | Marks<br>(100) | No.of<br>Correct<br>Answer | Marks<br>(100)       | (50% of A +<br>50% of B) |
| 1    | 912619106001 | AASHIMA M     | IV&ECE      | 10                            | 83             | 16                         | 80                   | 82                       |
| 2    | 912619106002 | ANANTHI P     | IV&ECE      | 11                            | 92             | 18                         | 90                   | 91                       |
| 3    | 912619106004 | JAFFARNISHA R | IV&ECE      | 10                            | 83             | 17                         | 85                   | 84                       |
| 4    | 912619106005 | MAHESWARI K   | IV&ECE      | 12                            | 100            | 14                         | 60                   | 80                       |
| 5    | 912619106006 | MANISHA S     | IV&ECE      | 10                            | 83             | 17                         | 85                   | 84                       |
| 6    | 912619106007 | MEGAVADHANA A | IV&ECE      | 9                             | 75             | 19                         | 95                   | 85                       |
| 7    | 912619106008 | PRIYANGA R    | IV&ECE      | 11                            | 92             | 16                         | 80                   | 86                       |
| 8    | 912619106009 | RAGAVIV       | IV&ECE      | 11                            | 92             | 16                         | 80                   | 86                       |
| 9    | 912619106010 | RAJAPRABA M   | IV&ECE      | 12                            | 100            | 18                         | 90                   | 95                       |
| 10   | 912619106011 | SASIKA K      | IV&ECE      | 10                            | 83             | 19                         | 95                   | 89                       |

Course Coordinator

Dr. S.THILAGAVATHIM.E.,Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN (Approved by AICTE, Affiliated to Anna University) KAIKKURICHI, PUDUKKOTTAI-622303

#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

#### **CERTIFICATE OF PARTICIPATION**

This is to Certify that Mr/Ms. AASHIMA M (Reg.No: 912619106001), IV ECE has

successfully completed Certificate Course on "Recent Applications in IDT using

Arduino and Raspbery PI " held at our college campus from 02.02.2023 to 12.05.2023

for the academic year 2022-2023.

COURSE COORDINATOR

Dr. S.THILAGAVATHI M.E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurshi + 622 303, Pudukkottai Dt

PRINCIPAL



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN (Approved by AICTE, Affiliated to Anna University) KAIKKURICHI, PUDUKKOTTAI-622303

#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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This is to Certify that Mr/Ms. MANISHA S (Reg.No: 912619106006), IV ECE has successfully completed Certificate Course on "Recent Applications in 10T using

Arduíno and Raspbery PI " held at our college campus from 02.02.2023 to 12.05.2023

for the academic year 2022-2023.

PRINCIPAL

**COURSE COORDINATOR** 

and the same come

Dr. S.THILAGAVATHI M.E., Ph.D PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai-25) Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

Criteria 2

**Teaching-Learning and Evaluation** 

350

**Key Indicator- 2.3. Teaching- Learning Process (40)** 

## 2022-2023

## ELECTRONICS AND COMMUNICATION ENGINEERING

## **PARTICIPATIVE LEARNING**

### **SYMPOSIUM AND WORKSHOP**



SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN (Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25) Kaikkurichi, Pudukkottai, Tamil Nadu – 622 303, India

#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING PARTICIPATIVE LEARNING (SYMPOSIUM/WORKSHOP/SEMINAR) ACADEMIC YEAR 2022-2023

| S.No | <b>Register</b> No | Student Name    | Year/Sem   | Name of the Learning Method<br>(Participative learning) |  |
|------|--------------------|-----------------|------------|---|--|
| 1    | 912619106004       | JAFFARNISHA R   | IV/VIII    | Symposium-Paper Presentation                            |  |
| 2    | 912619106010       | RAJAPRABA M     |            |   |  |
| 3    | 912619106005       | MAHESWARI K     | IV/VIII    |   |  |
| 4    | 912619106007       | MEGAVADHANA A   |            | Symposium- Paper Presentation                           |  |
| 5    | 912619106008       | PRIYANGA R      | IV/VIII    | Symposium- Paper Presentation                           |  |
| 6    | 912619106011       | SASIKA K        |            |   |  |
| 7    | 912619106006       | MANISHA S       | IV/VIII    | Symposium- Paper Presentation                           |  |
| 8    | 912619106009       | RAGAVI V        |            |   |  |
| 9    | 912619106004       | JAFFARNISHA R   | Part and a |   |  |
| 10   | 912619106005       | MAHESWARI K     |            |   |  |
| 11   | 912619106008       | PRIYANGA R      | IV/VII     | (Workshop - Embedded Systems)                           |  |
| 12   | 912619106006       | MANISHA S       | 10/011     |   |  |
| 13   | 912619106007       | MEGAVADHANA A   |            |   |  |
| 14   | 912619106010       | RAJAPRABA M     |            |   |  |
| 15   | 912619106011       | SASIKA K        |            |   |  |
| 16   | 912620106001       | ABIRAMI S       |            |   |  |
| 17   | 912620106007       | SONIYA P        | III/V      | Symposium- Paper Presentation                           |  |
| 18   | 912620106001       | ABIRAMI S       |            | Symposium- Paper Presentation                           |  |
| 19   | 912620106004       | JEYASRI K       | III/VI     |   |  |
| 20   | 912620106006       | SENPAGAHARINI V |            |   |  |
| 21   | 912620106007       | SONIYA P        | III/VI     | Symposium- Paper Presentation                           |  |
| 22   | 912621106009       | SUBALAKSHMI M   |            |   |  |
| 23   | 912621106006       | KEERTHANA V     | II/IV      | Symposium- Paper Presentation                           |  |

Dr. S.THILAGAVATHI M.E., Ph.D.,

PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

HoD/ECE

HOD / ECE SRI BHARATHI ENGINEERIN COLLEGE FOR WOMEN KAIKKURICHI, PUDUKKOTTAI - 622 303



(MRS G SENTHAMILSELVI)



Lena Vilakku, Pilivalam PO, Thirumayam Tk., Pudukkottai - 622507

(DR. V. KAVITHA)

# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING IMPETUS '22 A NATIONAL LEVEL TECHNICAL SYMPOSIUM CERTIFICATE OF PARTICIPATION

This certificate is presented to <u>Rejaffamisha</u> of <u>Sri Bharathi</u> Engineering college for Women for having participated in <u>Papes</u> <u>Presentation</u> at IMPETUS on OCTOBER 27, 2022.

> SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kalkkurchi - 622 303, Pudukkottai Dt.

M.E.Ph.D.

Dr. S.THILAGAN



# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING IMPETUS '22 A NATIONAL LEVEL TECHNICAL SYMPOSIUM CERTIFICATE OF PARTICIPATION

This certificate is presented to <u>M. Roja Prabha</u> \_\_ of <u>Sri Bharathi</u> Engineering college for Women for having participated in <u>Papes</u> <u>Presentation</u>\_ at IMPETUS on OCTOBER 27, 2022.

Dr. S.THILAGAVATHI M.E., Ph.D.

PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

(MRS G SENTHAMILSELVI)

HEAD OF THE DEPARTMENT

(DR. V. KAVITHA)



# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING IMPETUS '22 A NATIONAL LEVEL TECHNICAL SYMPOSIUM CERTIFICATE OF PARTICIPATION

This certificate is presented to <u>K. Maheswasi</u> of <u>Sri Bharathi</u> Engineering college for Women for having participated in <u>Papes</u> <u>Presentation</u> at IMPETUS on OCTOBER 27, 2022.

> COORDINATOR (MRS & SENTHAMILSELVI)

Dr. S.THILAGAVATHI M.E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303 Pudukkottai Dt. HEAD OF THE D

(DR. V. KAVITHA)



# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING IMPETUS '22 A NATIONAL LEVEL TECHNICAL SYMPOSIUM CERTIFICATE OF PARTICIPATION

This certificate is presented to <u>A.Megavadhana</u> of <u>Sri Bharathi</u> Engineering college for Women for having participated in <u>Papes</u> <u>Presentation</u> at IMPETUS on OCTOBER 27, 2022.

> COORDINATOR (MRS. G. SENTHAMILSELVI)

Dr. S.THILAGAV ATHIM.E. Ph.C

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai DL

(DR. V. KAVITHA)



(MRS G SENTHAMILSELVI)



Lena Vilakku, Pilivalam PO, Thirumayam Tk., Pudukkottai - 622507



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This certificate is presented to <u>R. Priyanga</u> of <u>Sri Bharathic</u> Engineering college for Women for having participated in <u>Prapes</u> <u>Presentation</u> at IMPETUS on OCTOBER 27, 2022.

> SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

ME. Ph.D

[DR. V. KAVITHA]

Dr. S.THILA



(MRS G SENTHAMILSELVI)

COLLEGE OF ENGINEERING AND TECHNOLOGY

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This certificate is presented to <u>K: Sasika</u> of <u>Sri Bharathi</u> Engineering college for Women for having participated in <u>Paper</u>. <u>Presentation</u> at IMPETUS on OCTOBER 27, 2022.

> PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

HIME.Ph.D.

(DR. V. KAVITHA)

Dr. S:THILAGAV





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This certificate is presented to <u>G. Manisha</u> of <u>Sri Bharath</u> Engineering <u>college</u> for Women for having participated in <u>Paper</u> <u>Presentation</u> at IMPETUS on OCTOBER 27, 2022.

> COORDINATOR (MRS\_G\_SENTHAMILSELVI)

Dr. S.THILAGAVATHI M.E., PH.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN HEAD OF THE DEPARTMENT (DR. V. KAVITHA)

Kaikkurchi - 622 303, Pudukkottai Dt.



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♦IEEE

# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING IMPETUS '22 A NATIONAL LEVEL TECHNICAL SYMPOSIUM CERTIFICATE OF PARTICIPATION

This certificate is presented to V.Ragavi \_\_\_\_\_ of Sri Bharathi Engineering college for Women for having participated in <u>Paper</u> Presentation\_ at IMPETUS on OCTOBER 27, 2022. COMBRINATOR HEAD OF Dr. S.THILAGAVATHI M.E., Ph.D., (MRS G SENTHAMILSELVI) (DR. V. KAVITHA) PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Naikkurchi - 622 303, Pudukkottai Dt.

| /   | NAAC<br>A'GRADE     |            | Autonomous Institut |                   |
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| Workshop on   | EMBEDD              |            | T                   | in ECE            |
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PRINCIPAL

Dr. S.THILAGAVATHI M.E., Ph.D., PRINCIPAL SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Hont - 622 303, Pudukkottai Dt.

|                        | Certificate of Participation NBA   |
|------------------------|--|
|                        | ELECTRO ETHNARCH   |
|                        | ECEntra'22   |
| This is to certify tho | The MAHESWARL K of IV ECE  |
| from SRI BHARATHI      | ENGINEERING FOR WOMEN has participated in a  |
| Workshop on            | EMBEDDED & IDT in ECEntra'22-National level  |
| Workshop & Tech        | nnical Symposium organized by Department of ECE held on  |
|                        | ember 2022 at K.Ramakrishnan College of Engineering, Trichy.<br>J.M.Maheswari<br>HOD/ECE<br>Dr.M.Maheswari<br>HOD/ECE<br>Dr.D.Srinivasan<br>PRINCIPAL<br>Dr.S.THILAGAVATHI M.E., P<br>PRINCIPAL<br>SRI BHARATHI ENGINEERING<br>COLLEGE FOR WOMEN<br>Kaikhurahi 02:303, Pudukkottai Dr. |

| NATIONAL NATIONAL   | K.RAMAKRISH<br>COLLEGE OF ENGINE<br>An Autonomous Institution<br>The Autonomous Institution<br>Autonomous Institution<br>Autonomous Institution<br>Autonomous Institution<br>Autonomous Institution<br>Autonomous Institution<br>Autonomous I | ERING<br>In the West of Hart<br>What pokes that<br>Inadu. India.<br>UNICATION ENGINEERING<br>.) | REM  |
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|   | <b>ELECTRO ETHNARCH</b>   |   |  |
|   | ECEntra'22  | 2   |  |
| This is to certify that   | PRIVANGA. R   | of IV ECE   |  |
| from SRI BHARATHI ENGINEE   | RING FOR WOMEN  | has participated in   | a  |
| Workshop on EMBEDD  | ED & IDT  | in ECEntra'22-National  |  |
| Workshop & Technical Sym  |   |   |  |
| and the second se | 2 at K.Ramakrishnan Coll  |   |  |
| Dr.M.Mah<br>Hod/E   | eswari  | Deminitasi  | Dr. S.THILAGAVATHINCE., Ph.D.  |
|   |   |   | SRIBUADATHI ENGINEERING<br>SCLEGE FOR WOMEN<br>Kaikkurchi - 622 303, Pudukkottai Dt. |
| · · · ·   |   |   |  |

| ELECTRO ETHNARCH   |
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| ECEntra'22   |
| This is to certify that MEGAVADHANA. A of IV ECE   |
| from SRI BHARATHI ENGINEERING FOR WOMEN has participated in a  |
| Workshop on EMBEDDED & IDT in ECEntra'22-National level  |
| Workshop & Technical Symposium organized by Department of ECE held on  |
| 23 <sup>rd</sup> September 2022 at K.Ramakrishnan College of Engineering, Trichy.  |
| Dr.M.Maheswari<br>HOD/ECE<br>Dr.D.Srinivasan<br>PRINCIPAL<br>Dr. S.THILAGAVATHI M.E., Ph.D.<br>SRI BHARATHI ENGINEERING<br>COLLEGE FOR WOMEN |
| ozz 303. Pudukkottai Dt.   |



| Image: |
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| ELECTRO ETHNARCH  |
| ECEntra'22  |
| This is to certify that Sasika K of IV ECE  |
| This is to certify that Jasika K of <u>IV ECE</u><br>trom Ini Bharathi Engineering College has participated in a  |
| Workshop on Embedded & IoT in ECEntra'22-National level   |
| Workshop & Technical Symposium organized by Department of ECE held on   |
| 23 <sup>rd</sup> September 2022 at K.Ramakrishnan College of Engineering, Trichy.   |
| Dr.M.Maheswari<br>HOD/ECE<br>Dr.D.Srinivasan<br>PRINCIPAL<br>Dr. S.THILAGAVATHI M.E., Ph.D.,<br>SRI BHARATHI ENGINEERING<br>OLLEGE FOR WOMEN<br>Kaikkurchi - OE2 303, Pudukkottai Dr  |



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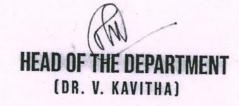
# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING IMPETUS '22 A NATIONAL LEVEL TECHNICAL SYMPOSIUM CERTIFICATE OF PARTICIPATION

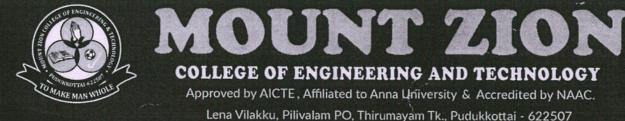
This certificate is presented to <u>ABIRANT</u>.S of <u>SRI BHARATHI</u> FOR WOMEN ENGINEERING COLLEGE for having participated in <u>PAPER PRESENTATION</u> at IMPETUS on OCTOBER 27, 2022.

COORDINATOR (MRS. G. SENTHAMILSELVI)

Dr. S.THIL M.E. Ph D SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN

Kaikkurchi - 622 303, Pudukkottai Dt







# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING IMPETUS '22 A NATIONAL LEVEL TECHNICAL SYMPOSIUM

## **CERTIFICATE OF PARTICIPATION**

This certificate is presented to <u>SONIVA.P</u> of <u>SRI BHARATHI</u> FOR WOMEN <u>ENGINEERING COLLEGE</u> for having participated in <u>PAPER PRESENTATION</u> at IMPETUS on OCTOBER 27, 2022.

Dr. S.THILAGAVATHIME. Ph.D.

SRI BHARATHI ENGINEERING COLLEGE FOR WOMEN Kaikkurchi - 622 303. Pudukköttai Dt. HEAD OF

(DR. V. KAVITHA)

COORDINATO

(MRS. G. SENTHAMILSELVI)

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Department of Electronics and **Communication Engineering** 

## Participation Certificate

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OD/ECE RINCIPA CHIEF EXECUTIVE OFFICER CHAIRMAN s.L.Malathy Dr. K.Ganesh Babu Dr. AVM.S.Karthick Shri. AVM.Selvaraj M.E. Ph.D. EERING

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DHURAN

Department of Electronics and **Communication Engineering** 

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W: Lomm HOD/ECE DRINCT CHIEF EXECUTIVE OFFICER CHATRMAN s.L.Malathy Dr. K.Ganesh Babu Dr. AVM.S.Karthick Shri. AVM.Selvarai Kalkkurchi-

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HII

Department of Electronics and Communication Engineering

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IOD/ECE RINCIPA CHIEF EXECUTIVE OFFICER CHAIRMA s.L.Malathy Dr. K.Ganesh Babu Dr. AVM.S.Karthick Shri. AVM.Selvaraj Dr. STHILAGA Kalkkurchi - 622 303

# TATE LEVEL TECHNICAL SYMPOSTUM TATE SANSCINCO 2023 STUM Department of Electronics and

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Communication Engineering

## Participation Certificate

This is to certify that Mr. /Ms. <u>P. SONIYA</u> <u>IN YEAR</u> <u>SRI BHARATHI ENGINEERING COLLEGE FOR</u> has participated in per Presentation / Event / Model Display organized by the partment of Electronics and Communication Engineering, endhuran College of Engineering and Technology, held on 3<sup>rd</sup> urch 2023.

M./ OD/ECE CHIEF EXECUTIVE OFFICER CHATRMAN ;.L.Malathy Dr. K.Ganesh Babu Dr. AVM.S.Karthick Shri. AVM.Selvaraj

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Department of Electronics and **Communication Engineering** 

## Participation Certificate

This is to certify that Mr. / Ms. M. SUBALAKSHMI DYEAR NOHEN SRI BHARATHI ENGINEERING COLLEGE FOR has participated in per Presentation / Event / Model Display organized by the epartment of Electronics and Communication Engineering, nendhuran College of Engineering and Technology, held on 3rd arch 2023.

**IDHURAN** 

10D/ECE s.L.Malathy



Dr. K.Ganesh Babu

DI STH

CHAIRMAN

CHIEF EXECUTIVE OFFICER Dr. AVM.S.Karthick

Shri. AVM.Selvaraj

**THIENGIN** OLLEGE FOR WOMEN Kaikkurchi - 622 303, Pudukkottai Dt.

HTM.E., Ph.D.,

# CHNICAL SYMPOSIUM STATE LEVEL T SANSCINCO 2023 Department of Electronics and **Communication Engineering**

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Komm HOD/ECE CUTIVE OFFICER CHAIRMAN PRINCIPAL CHIEF EXE rs.L.Malathy Shri, AVM.Selvarai Dr. K.Ganesh Babu Dr. AVM.S.Karthick Dr.S.THHLAGAW HIM.E. Ph.D. RI BHARATHI ENGINEERIN COLLEGE FOR WO Kaikkurchi - 622 303 Fudukkettal D